TRANSIT DEVELOPMENT PROGRAM

F.Y. 1977 UPDATE

SOUTHEASTERN CONNECTICUT REGION

ABSTRACT OF REPORT

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9.	Abstract:	This report updates information presented in the Transit Development Program for Southeastern Connecticut completed in September, 1975, summarizes actions that have been taken to implement the Program, and makes recommendations for additional transit-related actions. The report presents detailed recommendations for bus routing and scheduling and for bus stop and shelter locations.

F.Y. 1977 UPDATING OF THE TRANSIT DEVELOPMENT PROGRAM FOR THE SOUTHEASTERN CONNECTICUT REGION

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SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
139 Boswell Avenue, Norwich, Connecticut

June 1977

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TABLE OF CONTENTS

		Page
I.	INTRODUCTION	1
	Related Planning Activities	1
	The Need for Expanded Transit Service	1
II.	STATUS OF TRANSIT DEVELOPMENT PROGRAM (TDP) IMPLEMENTATION	2
	Proposed Service	2
	Transit District Activities	3
	Commuter Service Improvements	4
	Transit Planning Tasks	5
III.	DETAILING OF PROPOSED BUS ROUTES, STOPS AND SHELTERS	8
	Year-One Service	8
	East Lyme Fixed Route Service	12
APPENDICES		45
	Appendix One: A Staff Paper on Transfers and a Fare Structure	47
	Appendix Two: Urban Mass Transportation Administration Norwich/New London Capital Grant Application	59
	Appendix Three: Description of Transit Routes	61

LIST OF TABLES

Table		Page
1:	Route Summary Sheet.....	11
2:	Study Analysis of Alternative Futures for East Lyme Transit Service.....	15
3:	Projected Revenues and Costs for Fixed Route Transit Service For the Town of East Lyme Based on Alternative Future #5.....	16

LIST OF FIGURES

Figure		
	PROPOSED TRANSIT ROUTES FOR NEW LONDON	
1:	Ocean Beach.....	17
2:	High School.....	19
3:	Mall via Conn. College.....	21
4:	Mall via Broad.....	23
	PROPOSED TRANSIT ROUTES FOR NORWICH	
5:	Taftville.....	25
6:	Laurel Hill - Hamilton Avenue.....	27
7:	West Side.....	29
8:	Norwichtown.....	31
9:	Mohegan Park.....	33
	PROPOSED CONNECTOR SERVICE	
10:	Norwich-New London.....	35
11:	New London Detail.....	37
12:	Norwich Detail.....	39
	PROPOSED COMMUTER SERVICE	
13:	New London to E.B.....	41
	PROPOSED TRANSIT ROUTE FOR EAST LYME	
14:	Year Two.....	43

I. INTRODUCTION

This report represents an updating of information and recommendations presented in the Transit Development Program (TDP) for the Southeastern Connecticut Region. It is the third in a series of similar reports, the first of which was published in September, 1975, for the Southeastern Connecticut Regional Planning Agency. The TDP examines the status of, and need for, mass transportation facilities and presents a detailed five-year plan of action to meet those needs. The TDP also functions as the basis for Capital Grant Applications to the Urban Mass Transportation Administration (UMTA), an agency of the Federal Government. UMTA requires an annual updating of the TDP to ensure that the additional and changing needs of the population are being met by the transit program. Only then can the region be assured of continued eligibility for receiving financial support for transit equipment and operations from the Federal Government.

This report presents information and makes recommendations of transit-related subjects not already covered in the 1975 TDP and the 1976 update. It is, in effect, a status report on the continuing analysis of transit-related needs in Southeastern Connecticut.

RELATED PLANNING ACTIVITIES

Planning for transit facilities and services must be related to the overall comprehensive planning of a given area. The preparation of this document follows closely in time the completion of two other major planning studies for Southeastern Connecticut. A Regional Transportation Plan was prepared in 1975 and adopted by SCRPA in March, 1976. An updated version of the transportation plan was adopted in May, 1977. This document examines all transportation modes and makes recommendations for each. Included are transit needs and proposals for action, which will be considered in greater depth in this report.

SCRPA has also completed work on a revised comprehensive Regional Development Plan for Southeastern Connecticut. This Plan makes recommendations on a broad variety of subjects, including housing, utilities, the economy, open space and recreation facilities, and land use distribution. The revised plan was adopted by SCRPA on September 13, 1976.

THE NEED FOR EXPANDED TRANSIT SERVICE

Southeastern Connecticut has very little public transportation at the present time. Service consists basically of single-bus service operated in Norwich and New London by the respective transit districts in each town. In addition, various private operators provide limited long-haul service both within and through the region. Private operators also provide taxi service.

There are several reasons for improving public transit service in Southeastern Connecticut. First, it provides mobility for a large segment of our population, who, because of financial or physical reasons, do not have automobiles. This group includes the young, elderly, handicapped and low-income persons. Second, the growing congestion in our urban centers and on many inter-city highways calls for a national policy for decreasing automobile use. To accomplish this, an alternative mode of transportation must be conveniently available.

Third, the ever-increasing use of private automobiles is lowering the environmental quality of the region's development core. Exhaust pollutants, noise and the visual and ecological problems associated with the enormous acreage required for highways and parking lots has driven many residents and economic activities into the quieter and more undeveloped areas. This can lead only to an expansion of development into the areas of the region whose natural beauty will be irreversibly lost through random development.

Finally, public transportation can result in substantial energy conservation. Gasoline is not only rising in price, but the supply of this vital resource diminishes with every mile of travel by a motor vehicle. By providing the traveling public with a convenient and dependable alternative to the automobile in the form of transit buses, the number of vehicles on our streets and highways can be reduced, thus lowering fuel consumption for travel.

II. STATUS OF TRANSIT DEVELOPMENT PROGRAM (TDP) IMPLEMENTATION

The improvements recommended in the TDP for Southeastern Connecticut are designed to increase the quantity and quality of public transportation services in the region. Such an improved transit system will offer residents of the region increased access to employment, recreational, cultural, social, medical and retail activities.

PROPOSED SERVICE

The proposed system will consist of buses operating in a coordinated manner in nine of the region's towns. The system will have two major components: a primary system of local bus routes operating on fixed routes and schedules and a secondary system which will provide essential connector and commuter services between localities also operating on fixed routes and schedules. A third element, the demand-response services for the elderly and handicapped, will continue to be operated by the transit district towns independent of the general, fixed-route services until such time as they can be successfully integrated. The recommended primary system will provide extensive services within the urban cities. Secondary systems will connect the suburban towns with the urban centers and will provide a level of local service for those suburban towns.

The following are the general provisions of the recommended service improvements:

- All primary routes will interchange at central (terminal) points in New London and Norwich, on the hour and half-hour. Most primary routes will have 30-minute frequencies. Connector service between Norwich and New London will run on the hour.

- The base fare for service will be 30 cents. All elderly and handicapped persons will pay only one-half the regular fare.

- A transfer policy will be established which will allow patrons to transfer

to another route at a small additional charge.*

- The primary system will operate between 6:00 a.m. and 8:00 p.m. on Monday through Friday and half this level of service on Saturdays (i.e., either fewer runs or fewer hours). There will be no service on Sunday.

The TDP recommends that New London and Norich receive improved transit service in year one of the program. East Lyme, Groton, Ledyard, Montville, Preston and Waterford will have improved transit service in year two, and Stonington will have improved service in year four.

The recommended improvements also include provision for new signs, shelters, benches, and an extensive marketing campaign designed to encourage transit patronage. Construction of a major storage and maintenance facility in Preston also comprises a major portion of the recommended improvements for year one, with additional study of the need for a second garage in New London as the District becomes operational and a better view of needs can be attained.

Although specific transit recommendations are made in the TDP which directly affect only nine of the eighteen towns of the region, transit service should eventually be provided to each town within the region. An analysis of operational costs and ridership associated with the provision of service to the rural communities indicated that these communities would not be willing to support the cost of service at this time.

TRANSIT DISTRICT ACTIVITIES

The TDP was completed in September, 1975, and a summary of its recommendations was prepared for broad distribution throughout the region. Talks were begun with the towns recommended for inclusion in the proposed Transit District, and each was asked to send a representative to a meeting to prepare a recommended set of bylaws for the District. At the same time, a brochure, prepared jointly by SCRPA and CONNDOT indicating the steps needed to be taken by each municipality desiring to participate in the Transit District, was distributed to local officials. The brochure also outlined the voting structure of the proposed District Board of Directors and included a copy of Chapter 103a of the Connecticut General Statutes, which relates to the establishment of transit districts.

By December, 1975, East Lyme, Groton, Montville, New London, and Norwich had each voted to participate in forming the Southeastern Connecticut Transit District. On December 4, representatives to the District Board of Directors from the five municipalities met, adopted bylaws and elected East Lyme First Selecmtan Dennis J. Murphy as the first Chairman of the Board. Subsequently, the towns of Ledyard and Waterford voted to join the District, bringing the total membership to seven of the nine communities proposed in the TDP. The Board has met monthly since it was first formed and in January, 1977, elected its second Chairman, Raymond J. Botti, of Norwich.

A strong desire to implement the bus service proposals of the TDP was apparent in January, 1976, when the Board voted to immediately commence the preparation of a capital grant application to UMTA. A preliminary application was completed by

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* This recommendation has come into question and will be discussed later in this report.

SCRPA and CONNDOT staffs and was submitted to UMTA by March 15, 1976. A series of delays were encountered which prohibited the submission of the final grant application until April 1, 1977.

The 1975 TDP recommended that the transit district hire an administrator who would be responsible to the board of directors and would manage the service. The administrator would be responsible for working with the private bus operators, for developing capital grant applications for funding improvements, and for working with the Connecticut Department of Transportation in requesting operating funds.

The delays experienced with regard to the capital grant application have had a profound effect on the commitments of the Transit District Board as well as the whole future organization of transit services. Although the necessary resolutions had been acted upon to transfer transit operations from the New London and Norwich Transit Districts to the Regional District as of July 1, 1976, these actions were rescinded when it appeared that there would be substantial delays in the capital grant application process. The general feeling was that since the Regional District could not effect any meaningful improvements without the UMTA grant, there was no advantage in dissolving the local transit districts at that time. During this same period, the Regional District abandoned any effort to hire its own staff, choosing instead to maintain its dependence on SCRPA and the state until such time as the transit system became operational and administrative funds would become available through the UMTA Section 5 operating funds.

Probably the most profound change in the status of the transit district and the future structure of transit operations took place when the district found it had no choice except to rescind its commitment to the management of a regional transit system. This occurred in October, 1976, when the State of Connecticut announced that the entity responsible for the preparation of the capital grant application also had to take the responsibility for owning the equipment and managing the operations of the system. While the policy ostensibly left the District a choice, the municipal representatives did not perceive the mandate from their respective communities to include the obligations of ownership of rolling stock and a $1.5 million storage and maintenance facility. Subsequently, the District voted to turn the total responsibility for transit over the the state, retaining for itself an advisory role and an obligation for paying for part of the service deficit. As of this writing, the future role of the transit district is unclear.

COMMUTER SERVICE IMPROVEMENTS

In November, 1976, an effort to provide non-subsidized commuter services to the Electric Boat Division of General Dynamics was initiated by CONNDOT at the special request of the company to meet immediate and pressing parking and traffic problems as well as to expedite the movement of employees joining the company under a massive training and hiring program. As one of the largest employers in New England, the company has found it necessary to go beyond the boundaries of the state to hire and train employees. The net effect of the hiring program on transportation-related matters has been to further aggravate an already overtaxed system of vehicle movement in the greater Groton area as well as requiring the allocation of large quantities of company-owned land for parking.

In response to the request for assistance, CONNDOT assigned its Regional Public Transportation Manager and a small staff to direct efforts to link private long-haul carriers with potential commuters. Studies were conducted to determine potential areas of productive ridership. Subsequently, those areas were matched with private carriers who were willing to make buses available at the appropriate times. In a March 1977 memo prepared by the Public Transportation Manager, it was noted that there are 51 commuter routes which are presently in operation to the Electric Boat Division. This number is constantly changing though and will likely be out of date by the time this report is printed.

The original intent of the program was to concentrate commuter efforts on areas outside of Southeastern Connecticut or what otherwise might have been a fruitful commuter market for the Southeastern Connecticut Transit District. Through the process of stimulation of interest in commuter service at Electric Boat it has become necessary to develop service within the boundaries of Southeastern Connecticut, thus capturing riders and committing routes to private carriers that were intended to fall within the purview of the transit district. While there is little that the district can do at the present time to provide such service itself, the long-term economic implications of this situation are serious if the deficits of intratown operations are to be offset with commuter revenues.

In retrospect, the experience of commuter service at Electric Boat has to be viewed in the larger perspective of the need for commuter service throughout the entire region. This need goes far beyond the needs of one industry and includes all the other industries in the region as well as some of the major institutional employers such as hospitals and schools. This problem should and will be addressed in far greater detail in the coming fiscal year as part of the transit planning work program.

The events related to commuter service also underscore both the timing problems encountered in improving service and the need to remain flexible in planning. In all likelihood, the situation which exists as of this writing will be entirely different a year from now, not to mention 2 to 2 1/2 years from now when service improvements are expected to be made.

TRANSIT PLANNING TASKS

Bus Schedules

Promoting greater use of the bus transit provided by the local transit districts is a TDP recommendation that has been implemented with a high degree of success. During the latter part of 1975 a route map and schedule of the Norwich bus service was prepared with financial support from the Norwich Area Chamber of Commerce, SCRPA, CONNDOT, and UMTA. A similar document promoting the New London service was prepared in 1976, supported by the Chamber of Commerce of Southeastern Connecticut, SCRPA, CONNDOT, and UMTA. Both brochures publicized a merchants' bus-fare validation program, whereby shoppers can get a free bus ticket in return for patronizing the establishment of a participating merchant.

Marketing Study

As part of the Unified Work Program for FY 1977, SCRPA has scheduled two major tasks intended eventually to promote greater transit use and to ensure that

adequate service is provided to minority segments of the population. The first of these tasks is the preparation of a study intended to: (a) design a specific transit marketing program for the Southeastern Connecticut Transit District, and (b) to increase public support for and use of public transit service. This marketing and promotional study is being conducted by Urban Transportation Systems Associates, Inc., of Newton, Massachusetts. It is expected to be completed by July, 1977.

Elderly and Handicapped Needs Study

The second task involved the FY 1977 updating of the TDP. In connection with this task, a specific evaluation of the needs of the elderly and the handicapped was undertaken, and a plan to meet these needs was prepared. Titled "Transit District Options for Meeting Elderly and Handicapped Transportation Needs," the study was published by SCRPA in March, 1977. This report concluded that it was desirable, but unfeasible at the present time, to transfer the operations of the elderly demand-response systems to the management of the fixed route general transit system. While no problems were foreseen with respect to transfers between systems, or viewing the elderly system as an adjunct feeder system for the fixed route system, operational advantages were cited which could increase the efficiency of providing demand response services on a regional basis. Foremost among the reasons inhibiting such a transfer in the near future concerned the state's present policy providing matching funds exclusively for fixed route service. This would necessitate a net loss for fixed route service if Section 5 UMTA funds were used to support the cost of demand-response service. The report also uncovered a large gap in public transit service for handicapped individuals. Consequently, a recommendation was made, and subsequent approval given by the transit district, to utilize any surplus funds at the end of the first year of operation for the support of demand-response service provided by the district's municipalities. It was implicit in such a recommendation that the funds provided through the transit district would go to its member towns providing service to the elderly, and that the funds would be used to expand the scope of services to include transportation of handicapped individuals under 60 years of age wherever possible.

Bus Garage Study

Subsequent to the submission of the preliminary capital grant application in March, 1976, a series of investigations was undertaken based on facility recommendations made in an adjunct study by SCRPA called "Bus Garage Evaluation Study." That study recommended that construction of a new garage was inevitable if suitable building(s) were not available at the time the buses were anticipated to be acquired.

The preliminary capital grant application submitted to UMTA requested funds for 2 facilities; (1) a new storage and maintenance garage to be constructed on state-owned property on the east side of Route 12 in Preston, north of the Mohegan Pequot bridge, (2) an existing structure on Montauk Avenue in New London to be acquired and used as a secondary storage facility with the capability for minor maintenance.

During the site visit conducted by UMTA staff in September, 1976, as part of the grant application review process, it was recommended by UMTA that the first-year grant application delete the second garage in New London. It was UMTA's view that the justification for a second garage was unclear at the present time

and that further evidence for its justification could be gathered during the first year of operations. Consequently, plans were temporarily dropped to acquire the Montauk Avenue facility until the transit service has been operational for at least a year. Since UMTA tentatively endorsed the construction of a new facility, two steps were necessary to finalize the process: 1) an engineering feasibility study was necessary to determine in more detail the site and soil limitations and opportunities for sewer linkages with the nearby Norwich State Hospital;* 2) an appraisal had to be conducted to determine the value of the land to be used as part of the State's requirement for matching part of the capital grant.**

Both studies were carried out during the fall of 1976. The feasibility study was conducted under the auspices of the State Judiciary Department which was interested in using part of the larger site for the construction of a new courthouse. The study indicated that there were no major restrictions on utilizing the site for the intended purposes.

The value of the property was appraised at $89,000, the sum of which will be credited to the State's share of the 20% of the cost of the entire project.

It is intended that the architectural and engineering work would begin immediately upon the funding of the UMTA Section 3 capital grant application. This should provide sufficient lead time necessary to complete the construction prior to the arrival of the buses.

Transfers Study

As an adjunct to the preparation of this TDP update, a re-examination of the prior TDP recommendation on transfers and fare structure was undertaken. A staff paper was prepared and presented to the Transit District in April, 1977, a copy of which is included in the Appendix of this TDP.

The issues addressed in the paper challenged the premises and conclusions of the earlier TDP on the subject of transfers. The earlier TDP had recommended that a system of transfers should exist throughout the transit system and that transfers should be free and unlimited. The staff paper attempted to show that on a district-wide basis free transfers were economically unworkable since there was no equitable way of sharing the cost of the transfering rider among the municipalities through which he travels.

The paper concluded by suggesting that free transfers throughout the system be limited to initial marketing efforts undertaken during the early weeks of transit operation to promote transit use. It also suggested that transfers would not cause economic havoc if limited to local service in one town, such as between routes within Norwich or New London.

The question of transfers brought into focus the entire structure for fare

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* Flaherty-Giavara Associates, Feasibility Report, Site and Utility Analysis, New London County Courthouse and DOT Garage, Project JD-47A, Preston, Connecticut, December, 1976.

** Silverstein, F. Jerome, Real Estate Appraisal for Southeastern Connecticut Regional Planning Authority, January, 1977.

collections. In so doing, it was concluded that unless a fare collection system could be developed whereby fares collected on connector routes could be credited to the town of origin, the distribution of the deficits (cost minus revenues) for that particular phase of the service would be inequitable as originally proposed.

Clearly, the issues presented in the staff paper will require further study and policy determination on the part of both the state and the district in the coming months prior to the initiation of service.

III. DETAILING OF PROPOSED BUS ROUTES, STOPS AND SHELTERS

YEAR-ONE SERVICE

A major part of the TDP update involves the final designation of routes, and the location of bus stops and bus shelters. It is logical to ask, why routes, stops and shelters should be designated at this time. The answer to the question concerning routes is that the transit system as designed is intended to operate on fixed routes with fixed schedules rather than variable routes and variable schedules as might be found in a demand-response, dial-a-ride type of system.

With respect to designating bus stops, public safety considerations require that fixed stops be established to protect the bus riders and other pedestrians, as well as to minimize the disruption of surrounding vehicular traffic. The present procedure is to have a passenger flag-down a bus wherever he or she might be standing. This is unsafe for all concerned. Likewise, a bus driver might very well miss a potential passenger's signal, resulting in service delay for that passenger. Furthermore, a potential passenger new to the area and unfamiliar with the signal system may continue to miss buses until the signal system somehow is learned. Therefore, with public safety foremost in mind, special stopping areas have been designated, usually near intersections, where a bus can pull off the road without jeopardizing the safety of anyone within the immediate area.

With respect to timing, the rationale is not quite as straight forward. As of this writing, certain timing problems have arisen which were totally unforeseen when the original TDP was prepared. At that time it was believed that transit needs could best be met by phasing improvements over a 5-year period. Since that time, extenuated delays have occurred and other delays are expected which will require a thorough review of the phased service improvements recommended in the original TDP. As of this writing for example, it is anticipated that manufacturing delays of up to two years or more will prolong the actual initiation of improved service as much as three years beyond the originally intended service initiation date.

This means that service needs projected beyond year one in the original TDP are no longer meaningful in the original context in which they were developed. In fact, due to the incredible delays, one could easily conclude that by the time service is actually initiated in "year one," all the service improvements recommended in the original TDP to occur over a 5-year period should be implemented at that time.

This back-up has begun to cause marked conflict between transit needs ori-

ginally intended to be spaced over the first two-year period. This conflict is most apparent now in the provision of connector and commuter service. The original TDP recommended the initiation of commuter service in year one and connector service in year two. This TDP update is recommending that connector service also be initiated in year one and that adjustments be made in the use of the capital equipment, as necessary, so that both services can be accommodated at the outset.

Thus, with the huge timing problems being experienced, and the "real world" changes that occur as a matter of course, we are finding it of increasing importance to adjust to time delays by becoming more flexible in our planning for the allocation of the fixed resources of capital equipment as specified in the capital grant application presently being processed. (See Appendix Two.)

The 1975 TDP acted as the primary guide for the route designations of this TDP. Other sources of information for this updating process were routes which are in actual operation at the present time under the auspices of both the Norwich and the New London Transit Districts, to the extent that they differ from routes recommended in the original TDP. In addition, consideration has been given toward refining routes based on input from a variety of sources. For example, at a SCRPA-sponsored public hearing on the general subject of transportation needs, testimony was given regarding the need to serve Mohegan Community College in Norwich with mass transit. Consequently, consideration was given to the feasibility of serving not only the College but the nearby Mohegan Park area as well. As a consequence of this input, routes throughout the City of Norwich were rearranged to accommodate this request for service.

The accompanying maps show each proposed route, stop, and shelter. The various proposals for local service in Norwich and New London have been reviewed by the Directors of the respective local transit districts. A route summary sheet following this text provides a numerical overview of route mileage and the number of stops and shelters.

The accompanying maps have been prepared in such a way that the maximum amount of information can be graphically displayed with the minimum amount of confusion and uncertainty. Routes are designated by the solid lines in proximity to the highways over which they travel. Highways with a single line running down them designate a route which has a bus running only one way. Highways with double lines indicate routes with buses operating in both directions. In all cases, routes with buses operating in two directions follow a conventional right side-of-the-street travel pattern. This is reinforced by the directional arrows shown next to each route.

Route information is divided into three sub-categories: a) local routes, b) connector routes, and c) commuter routes. The distinction is that local routes start and stop within the boundaries of a single municipality while connector routes cross the boundary of more than one town. Commuter routes operate across town boundaries but will do so only during certain hours of the day.

As suggested in the legend, certain routes operate "irregularly," as indicated by the continuous dashed line. It was found useful to categorize service in this fashion even though the range of irregular service was broad. That is, service to the Norwichtown Industrial Park, for example, will operate daily, but only during certain hours, while service to Mohegan Park is intended to take place only during the summer months between Memorial Day and Labor Day and be discontinued during

the rest of the year. Likewise, commuter service from New London to Electric Boat will operate only during certain hours of the day, as it does at present.

The triangular symbol designating the start/stop of a route is important not only as a location identifier, but is also related to the "pulsating" scheduling arrangement which is the basis of the system. In a pulsating system, buses from local and connector routes converge on the central start/stop locations on the half-hour. Thus, one can transfer to another route with minimal waiting time. A shelter has been designated for each of these terminal points in both Norwich and New London.

The designation of stops and shelters resulted from driving each route by auto or bus to determine the exact location. An attempt has been made to suggest the side of the intersection on which the stop is to be made (near side or far side). Detailed information on the exact location of stops can be found in the Appendix.

Likewise, shelter locations were determined on the basis of a windshield survey and input from local transit managers. Shelter locations are based on several factors. The first consideration employed in locating shelters was based on their limited availability. The present capital grant application to UMTA requests $45,000 for 15 shelters. Therefore, the first principle was to locate shelters at stops where there was no other opportunity for riders to seek other forms of shelter. In this regard, it was found useful to locate stops where some type of shelter was possible, such as roof overhang, adjacent store or an existing bus shelter as occurs opposite Lawrence and Memorial Hospital on Montauk Avenue in New London. When this was not the case, those stops became preliminary candidates for shelters.

The second principle influencing shelter location concerned density and potential ridership. A bus stop becomes a priority candidate for a shelter if there is no existing shelter and if it appears likely that the stop will attract a high volume of riders because of its location. In this regard it was recognized that beyond a certain point, ridership volumes are speculative and cannot be fully appreciated until some time after the system becomes operational. Thus we are recommending that: 1) an attempt be made to purchase shelters at less than $3,000 each to increase the total number of shelters available for use by the District, 2) less than the full complement of available shelters be located initially, allowing for experience to determine precisely where the remainder are needed. As can be seen on the summary sheet, eighteen route shelters are recommended plus the two shelters to be located in Franklin Square in Norwich and at Union Station in New London. Each one of these proposed shelters is a high priority location, underscoring the need to reduce the unit cost of the shelters by at least one third in order to increase the number of available shelters. Due to the longer headways, (one hour) future priorities for shelter locations would logically rest with connector service, where only 3 shelters are presently indicated.

Likewise, the purpose of listing the number of bus stops is to add substance to previously prepared estimates regarding the number of bus stop signs which would be needed. If each bus stop requires one no parking/bus stop sign, then our summary sheet indicating a need for 305 signs is very close to the request in the capital grant application for 300 signs.

TABLE 1

ROUTE SUMMARY SHEET

Route Name	Total Mileage	Number of Stops*	Number of Shelters**
Local/Norwich			
1. Taftville	10.0	28	1
2. West Side	8.8	21	2
3. Laurel Hill-Hamilton Avenue	9.1	19	1
4. Mohegan Park	6.8	20	2
5. Norwichtown	8.9	36***	2
Subtotal:	43.6	124	8
Local/New London			
1. High School	5.7	27	1
2. Ocean Beach	8.7	41	3
3. Mall via Broad	5.3	21	2
4. Mall via Connecticut College	5.7	24	1
Subtotal:	25.4	113	7
Connector			
Route 32	28.0	35*	2
Route 12	31.6	33*	1
Subtotal:	59.6	68	3
Grand Total:	128.6	305	18#

* Includes start/stop.

** Excludes Norwich, New London start/stop shelters.

*** Includes 8 stops in the Industrial Park.

\# Two shelters for Norwich and New London start/stop points would raise this figure to 20. The UMTA application calls for 15 shelters @ $3,000 each. See text for further explanation.

Commuter Service

Commuter service for year one will vary slightly from the routes originally shown in the first TDP. The reasons for this were partially explained in the prior section on routes.

At present, the plan is to use two of the four 48-passenger buses to be available in year one for morning and evening commuter trips. Both buses will travel from Union Station in New London to General Dynamics in Groton, operating on alternating schedules. A second commuter route recommended in the original TDP was to have the commuter bus traveling through New London in a similar manner to local service picking up Electric Boat commuters along the way at designated stops. With the local service improvements scheduled for year one, the pulsating action of local New London buses arriving simultaneously at Union Station makes such a route unnecessary, and it becomes simply a question of coordinating the local New London bus schedule with the commuter service. A third commuter route was to have operated between New London and the U.S. Submarine Base in Groton. This special commuter route is being deleted from year one service due to the fact that connector service on Route 12 will meet that need.

As such, commuter service to Electric Boat will occur between the hours of 6:30 and 9:00 a.m. and 3:30 to 6:00 p.m. on weekdays. Local service in New London will begin at 6:00 a.m. During the time period between 9:00 a.m. and 3:30 p.m., the two commuter buses will be reintegrated into the connector service operating on Routes 32 and 12, effectively reducing the connector route headway from one hour to one-half hour through staggered scheduling. Future service improvements should move to upgrade both commuter and connector service to a level originally recommended in the TDP, keeping in mind that commuter service operates only 6 hours/day 5 days/week. As such, vehicles acquired on behalf of commuter service should have some other use during the non-commuting period.

EAST LYME FIXED ROUTE SERVICE

Due to the fact that the present state policy with respect to cost sharing for transit is limited to fixed route service, a recommendation is being made that planned service in East Lyme be changed from demand-response to fixed route. This recommendation is at variance with the recommendation made in the original TDP. The prior TDP recommendation on the subject projected an annual cost of $12,420 for East Lyme based on a then projected demand-response operating cost/hour of $11.50. At that time it was believed that the cost of operating a demand-response service would be 10% more than operating fixed route service, which itself was being projected at $10.00 per hour. In the accompanying analysis conducted on behalf of East Lyme, it was found that by switching to fixed route service, local costs could be reduced to $3,000-5,000, depending mostly on the number of hours per day service was provided. This cost could be reduced even further if the actual paying ridership was larger than what was projected.

Consequently, we find that with the present state policy favoring fixed route service, it is financially advantageous under almost any conditions for a town to provide fixed route rather than demand-response service. Should the state policy favoring fixed route service be altered in the future, it will be necessary to re-evaluate the level of service proposed for East Lyme and for some of the other suburban towns as well.

Prior to coming to this conclusion, a numerical study was conducted which compared six reasonably conservative scenarios of transit service for East Lyme using four independent variables. They were: 1) the average number of potential passengers using the bus each hour, 2) the number of hours of operation each day, 3) the amount of time it would take a bus to complete one full route, 4) the route distance. The production factor, as shown by Table 2, Column F, is the simple relationship between passengers per day and miles of operation per day. The figure is useful in calculating revenue and is also a good standard by which to gauge the efficiency of a transit system. A rural transit system with sparse population operating over long distances will have a lower production factor than an urban system with dense population and operating in shorter overall distances.

The purpose of the first part of the analysis was to get a feel for the type of ridership and service that might be expected in a town such as East Lyme. In the middle stages of the analysis, an attempt was made to estimate costs, revenues, and deficits, based on the earlier data. Of primary concern in this section is the annual cost to the Town of East Lyme as shown in Column N of Table 2. The formula by which this cost is derived is complex in that it involves variable proportional cost sharing by the Federal, State and town governments.

Two things are evident from this part of the analysis. The first is that the cost of the service is a direct function of the cost per hour and the number of hours of operation per day. What is interesting is that except for the total hours of operation, the total cost of providing service bears less relation to the other service variables such as headway or route miles.

Also of interest are the rather low projections of daily revenue as compared to the higher cost of daily operations. What is evident is that at $.30 per fare, the operation falls far short of being self-supporting. To be precise, the fare would have to be more than $2.50 per ride for the system to be self-supporting at its projected level of ridership. Consequently a gap exists between the cost of the service and the revenues. This gap constitutes the essence of the economics of public transit. If ridership volumes cannot be increased, and if fares are to remain low and attractive, then the service is going to have to be publicly subsidized on a continuing basis.

This brings us to the final part of the analysis. Major emphasis was placed only on that share of the deficit borne by East Lyme. Based on the range of scenarios presented, alternative #5 was considered to have the conditions most like what can be expected to be found in East Lyme in 1980.

A recommended route, covering a distance of 18.8 miles, has been developed with East Lyme officials and is shown on Figure 14. A conservative estimate projects 25% of the cost of the service to be taken through the farebox, or a production factor of .5. Table 3 indicates projected revenues and costs for years two through five. Farebox revenue projections assume that East Lyme maintains a separate system for elderly and handicapped residents and that all fares collected are full 30-cent fares. A fixed annual revenue of $10,000 over the 4-year period has been used to simplify calculations. This assumption also biases the projections on the conservative side. In all likelihood, ridership will increase during the 4-year period rather than remain fixed. Hopefully, the rate of ridership increase will equal the projected annual rate of inflation. If this occurs, then the increased costs due to inflation will be offset by the increase in the amount of revenue taken through the farebox and the portion of the deficit carried by

the town will remain stable rather than increasing as shown. Service is recommended to operate for a period of 12 hours daily, rather than 14 hours, as another cost savings device. This should be reviewed after service has been operational for at least 6 months.

East Lyme service should commence in year two as originally planned. Capital grant application procedures should begin no later than December, 1977, to insure that the buses will be available when required. The intersection of Route 161 and 156 in Niantic is recommended to be the transfer point for eastbound feeder service into New London.

TABLE 2

STUDY ANALYSIS OF ALTERNATIVE FUTURES FOR EAST LYME TRANSIT SERVICE

	A	B	C	D	E	F	G	H	I	J	K	L**	M**	N**
	Est. Pass./ hr.	Oper. hr./ day	Headway	Miles/ run	Miles/ day	Est. Prod. Factor	Pass. miles	Revenue/ day*	Revenue/ yr. (276 days operation)	Cost/ day at 12.65/ hr.	Proj. Oper. Cost For yr. #1	60% of Oper. Cost	Less Proj. Revenue (L-I)	Local Share (25%)
1.	5	10	30	10	200	.25	50	$15	$4,140	$126.50	$34,914	$20,948	$16,808	$4,202
2.	5	12	30	10	240	.25	60	$18	$4,968	$152	$41,952	$25,171	$20,203	$5,051
3.	5	14	30	10	280	.25	70	$21	$5,796	$177	$48,880	$29,328	$23,532	$5,883
4.	10	10	60	20	200	.5	100	$30	$8,280	$126.50	$34,914	$20,948	$12,668	$3,167
5.	10	12	60	20	240	.5	120	$36	$9,936	$152	$41,952	$25,171	$15,235	$3,809
6.	10	14	60	20	280	.5	140	$42	$11,592	$177	$48,880	$29,328	$17,736	$4,434

* Based on 30-cent fare.

** Columns L and M were included to show how the local share is derived. A "short form" formula has been developed whereby revenues are subtracted from 60% of the operating cost with 25% of the remainder equaling the local share. This short formula is derived from a federal funding policy which pays for 50% of the operating deficit and two state policies, one of which eliminates any local contribution if the revenue taken through the farebox is equal to, or greater than, 60% of the operating cost. Should revenues fall below 60%, then the difference is shared equally between the state and the local community. The second state policy is that the state will directly pay for 40% of the operating costs. Thus, if operating costs = $48,880 and farebox revenues = $11,592, then the deficit = $48,880 - $11,592 = $37,288. The state's share = 40% of $48,880 = $19,552 plus 1/2 the difference between 60% of $48,880 ($29,328) and revenue ($11,592). Therefore, $29,328 - $11,592/2 = $8,868. Therefore, the gross state share of the deficit = $19,552 + $8,868 = $28,420 while the gross local share = $8,868. Since UMTA reimburses 50% of the deficit, the net state share = $28,420/2 = $14,210. While the net local share = $8,868/2 = $4,434.

TABLE 3

PROJECTED REVENUES AND COSTS FOR FIXED ROUTE
TRANSIT SERVICE FOR THE TOWN OF EAST LYME
BASED ON ALTERNATIVE FUTURE #5

	Year of Operation			
	2	3	4	5
Cost per hour	$ 12.65	$ 13.90	$ 15.30	$ 16.80
Cost per day (12 hours)	$ 152	$ 167	$ 184	$ 202
Cost per year (276 days)	$41,952	$46,092	$50,784	$55,752
60%*	$25,171	$27,655	$30,470	$33,451
Less Revenue*	$10,000	$10,000	$10,000	$10,000
Remainder*	$15,171	$17,655	$20,470	$23,451
Local share (25%)*	$ 3,793	$ 4,414	$ 5,118	$ 5,863

* See explanation of deficit sharing on Table 2.

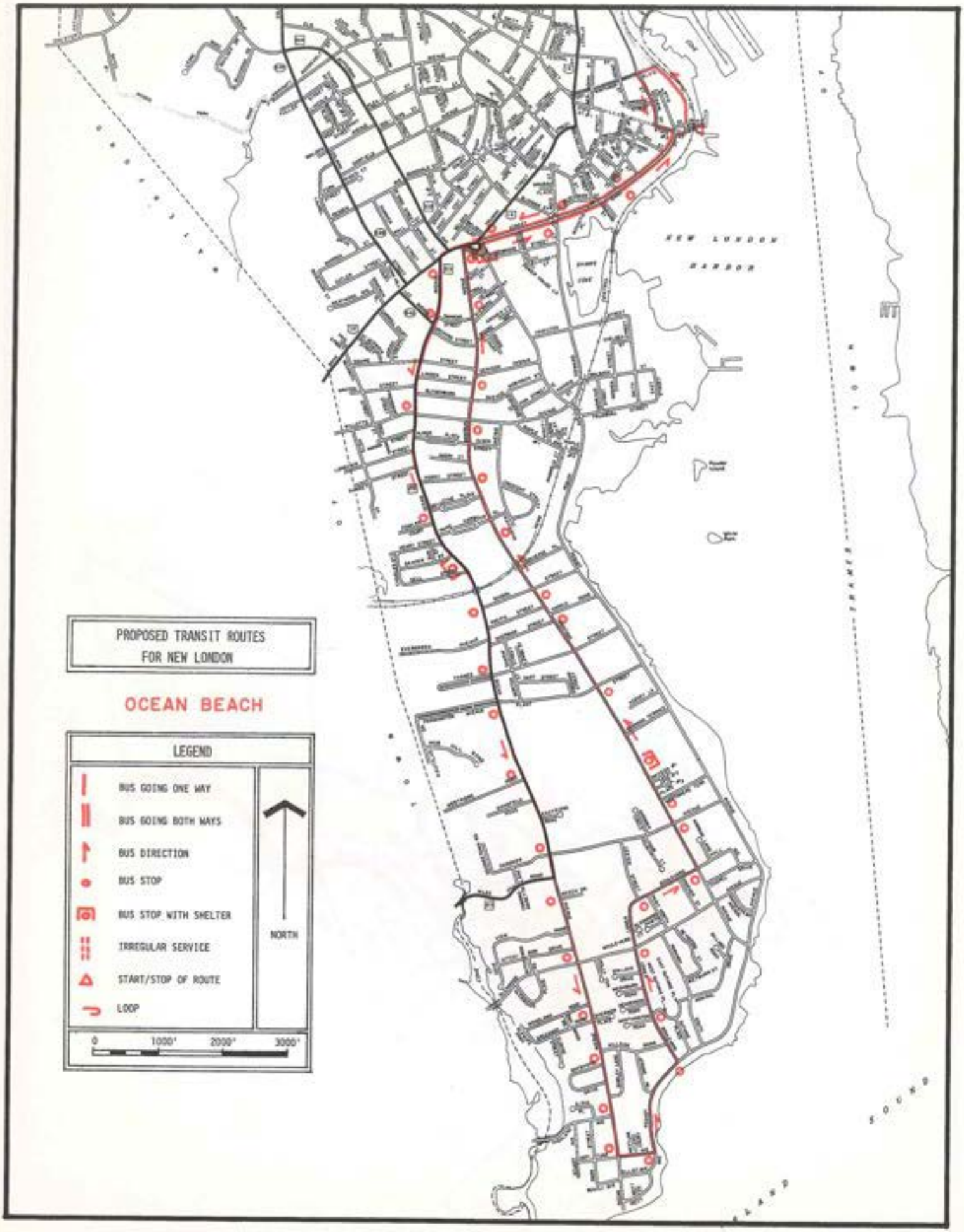
PROPOSED TRANSIT ROUTES
FOR NEW LONDON
OCEAN BEACH
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1000'
2000'
3000'
NEW LONDON
HARBOR
THAMES
RIVER
POOL
LONG
ISLAND
SOUND

FIGURE 1

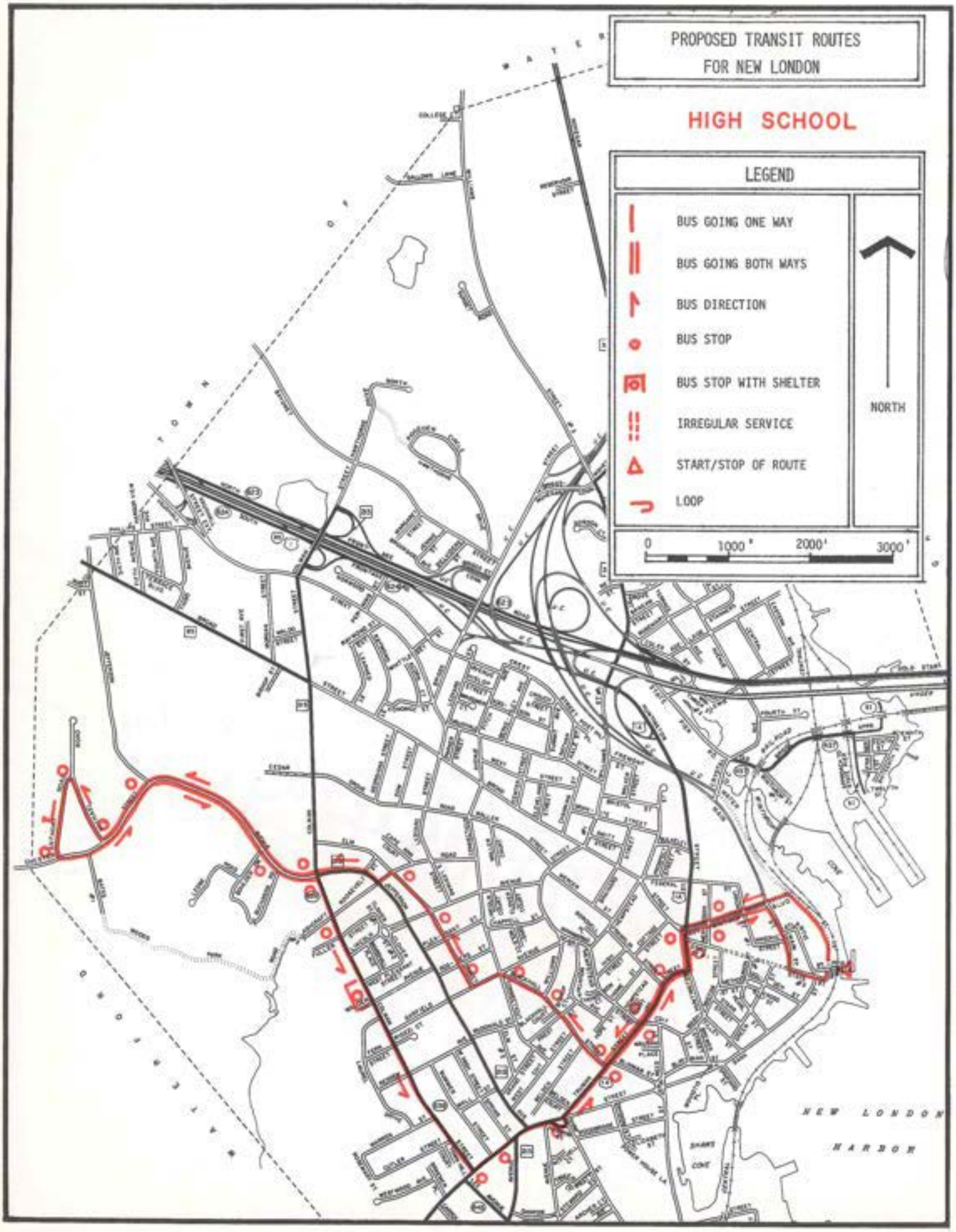
PROPOSED TRANSIT ROUTES
FOR NEW LONDON
HIGH SCHOOL
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1000'
2000'
3000'
NEW LONDON
HARBOR

FIGURE 2

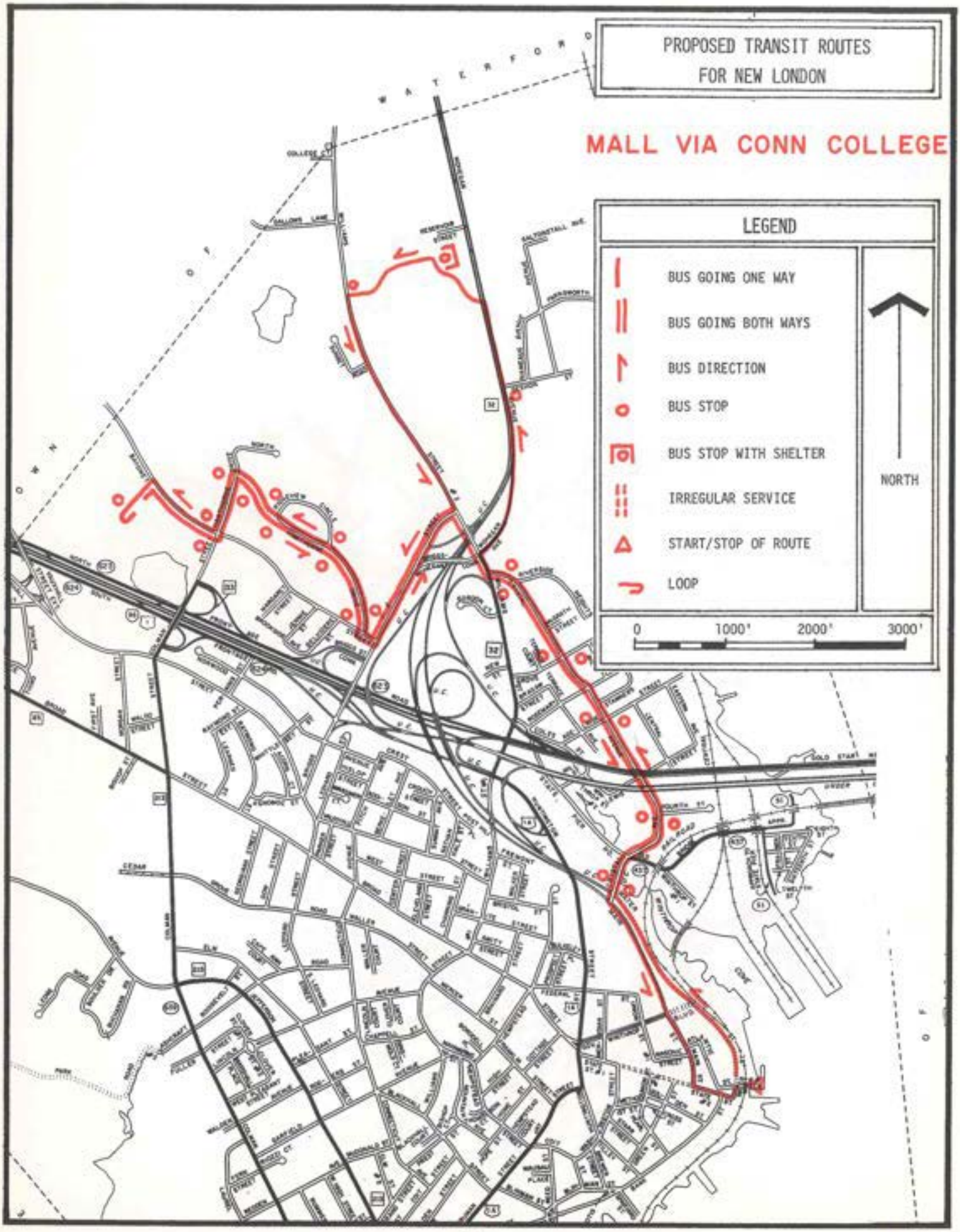
PROPOSED TRANSIT ROUTES
FOR NEW LONDON
MALL VIA CONN COLLEGE
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1000'
2000'
3000'

FIGURE 3

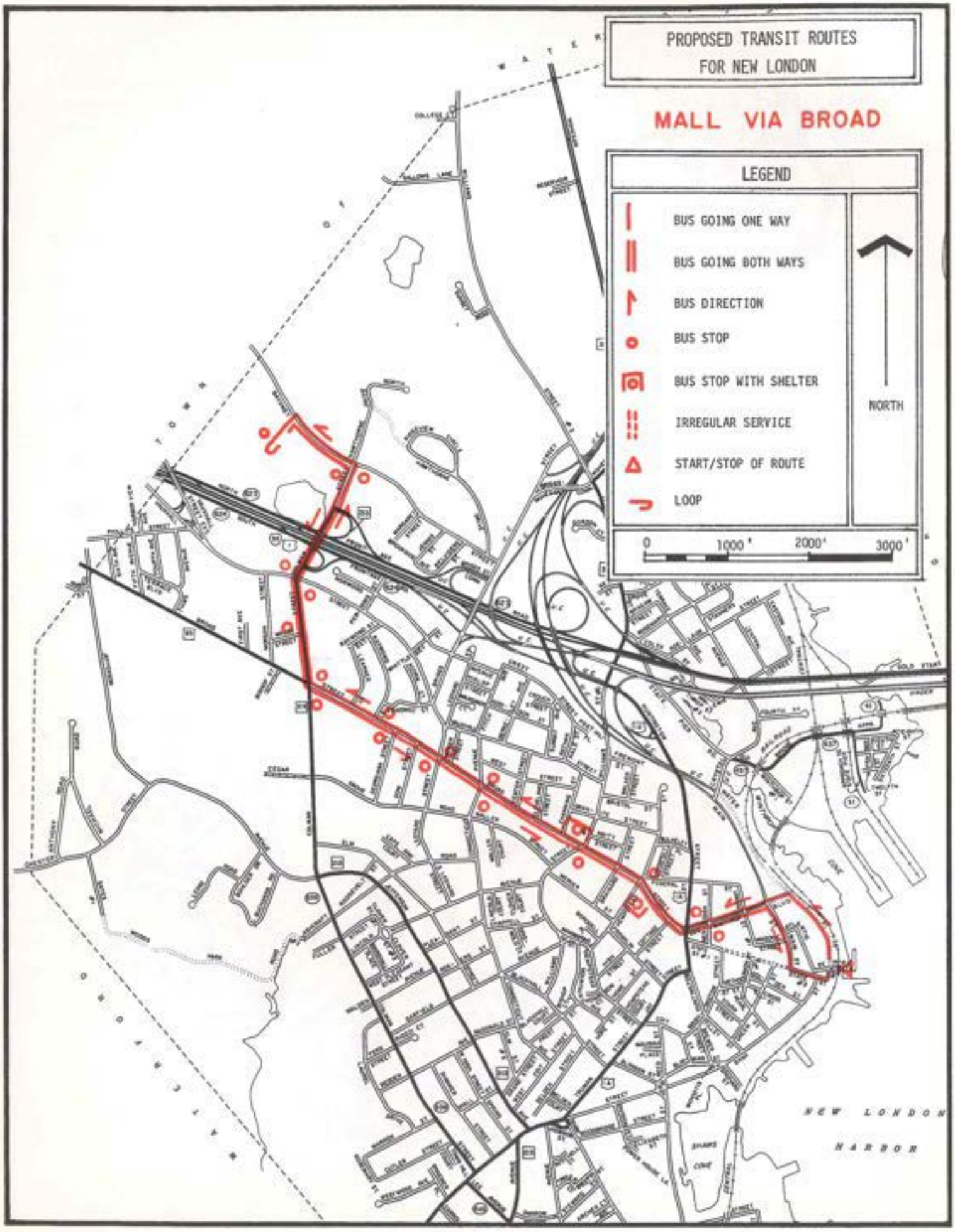
PROPOSED TRANSIT ROUTES
FOR NEW LONDON
MALL VIA BROAD
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1000'
2000'
3000'
NEW LONDON
HARBOR

FIGURE 4

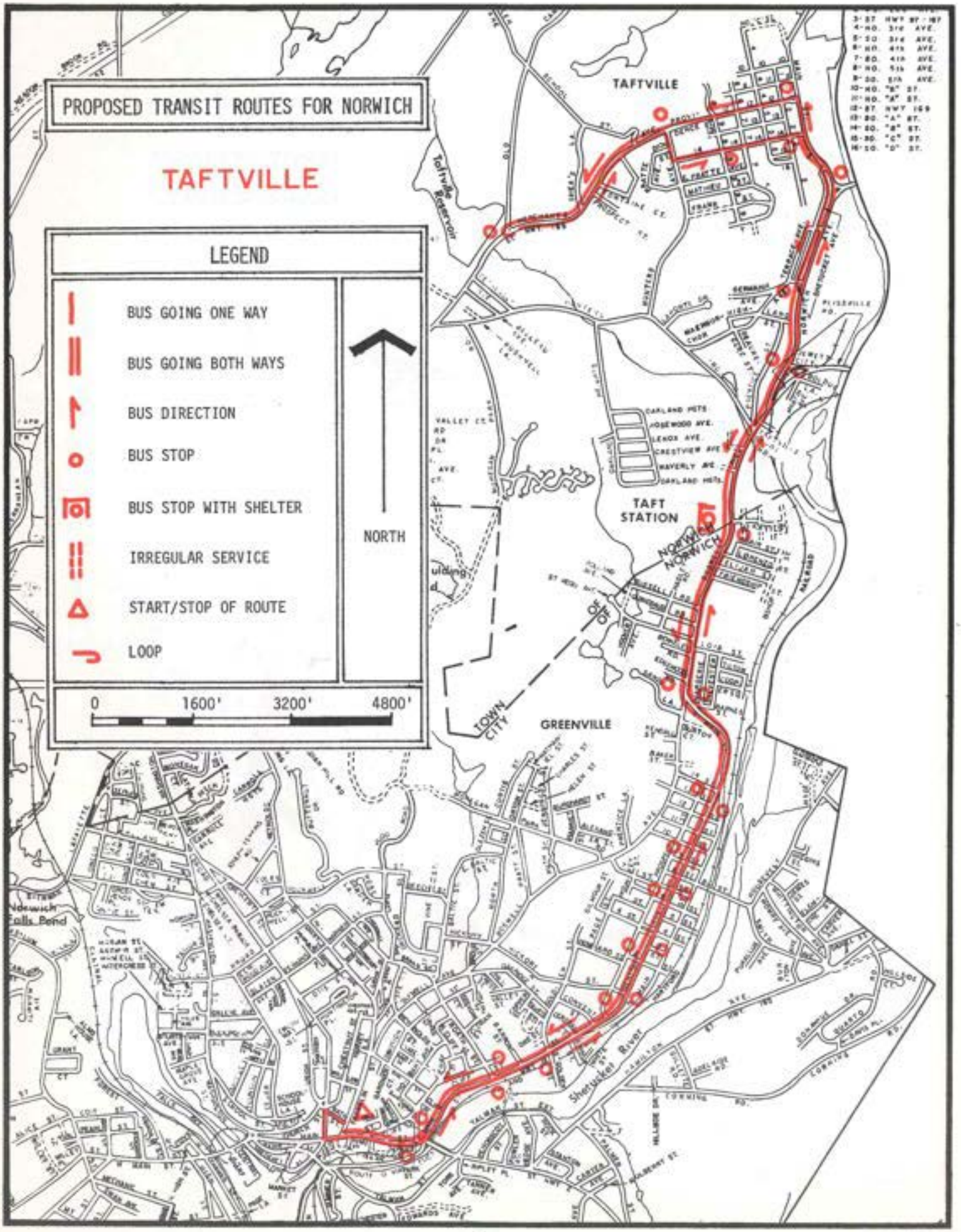
PROPOSED TRANSIT ROUTES FOR NORWICH
TAFTVILLE
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1600'
3200'
4800'
TAFTVILLE
TAFT STATION
GREENVILLE
TOWN CITY
NORWICH
Taftville Reservoir
Sherbrooke River

FIGURE 5

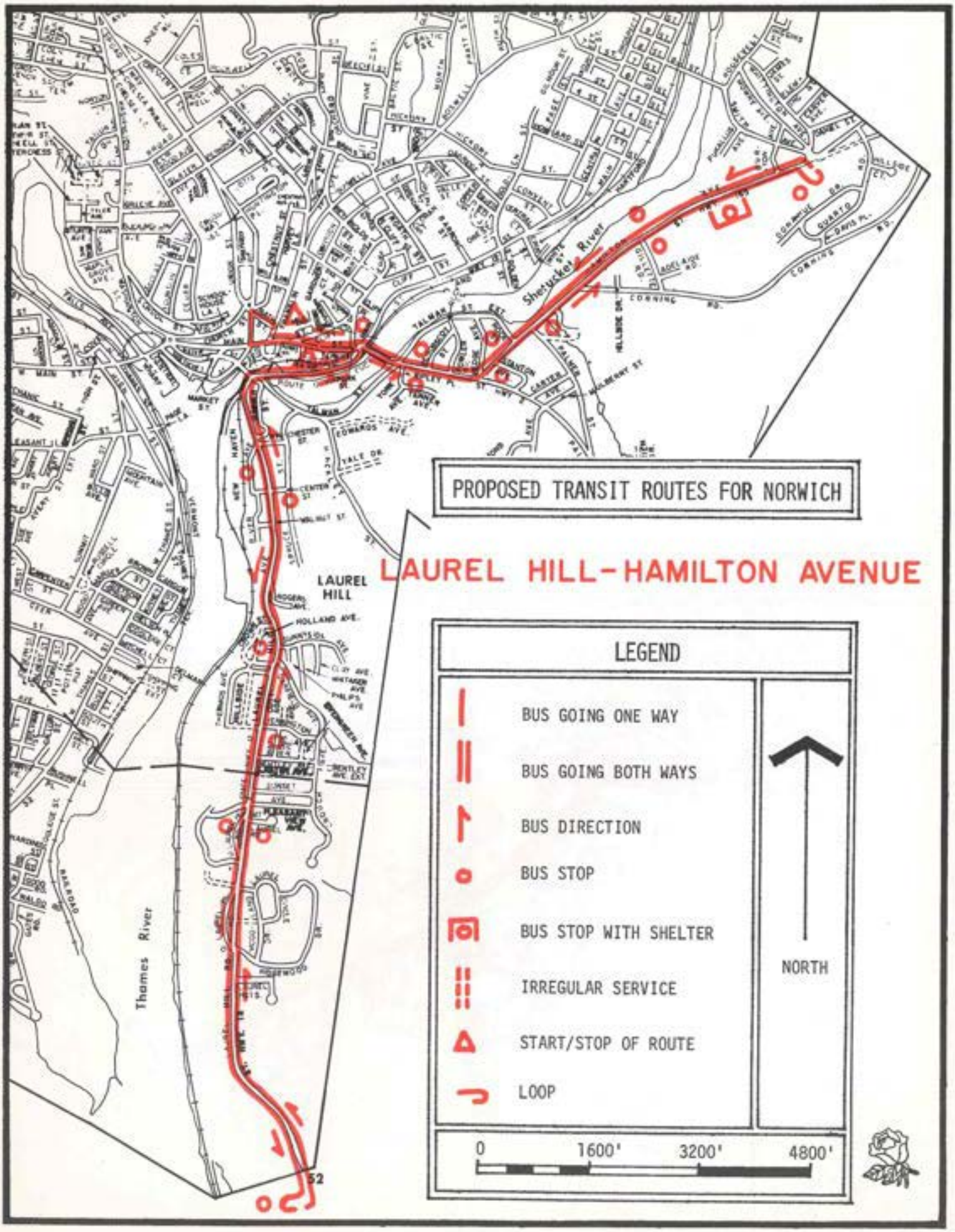
PROPOSED TRANSIT ROUTES FOR NORWICH
LAUREL HILL-HAMILTON AVENUE
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1600'
3200'
4800'
Thames River
Shetucket River
LAUREL HILL
52

FIGURE 6

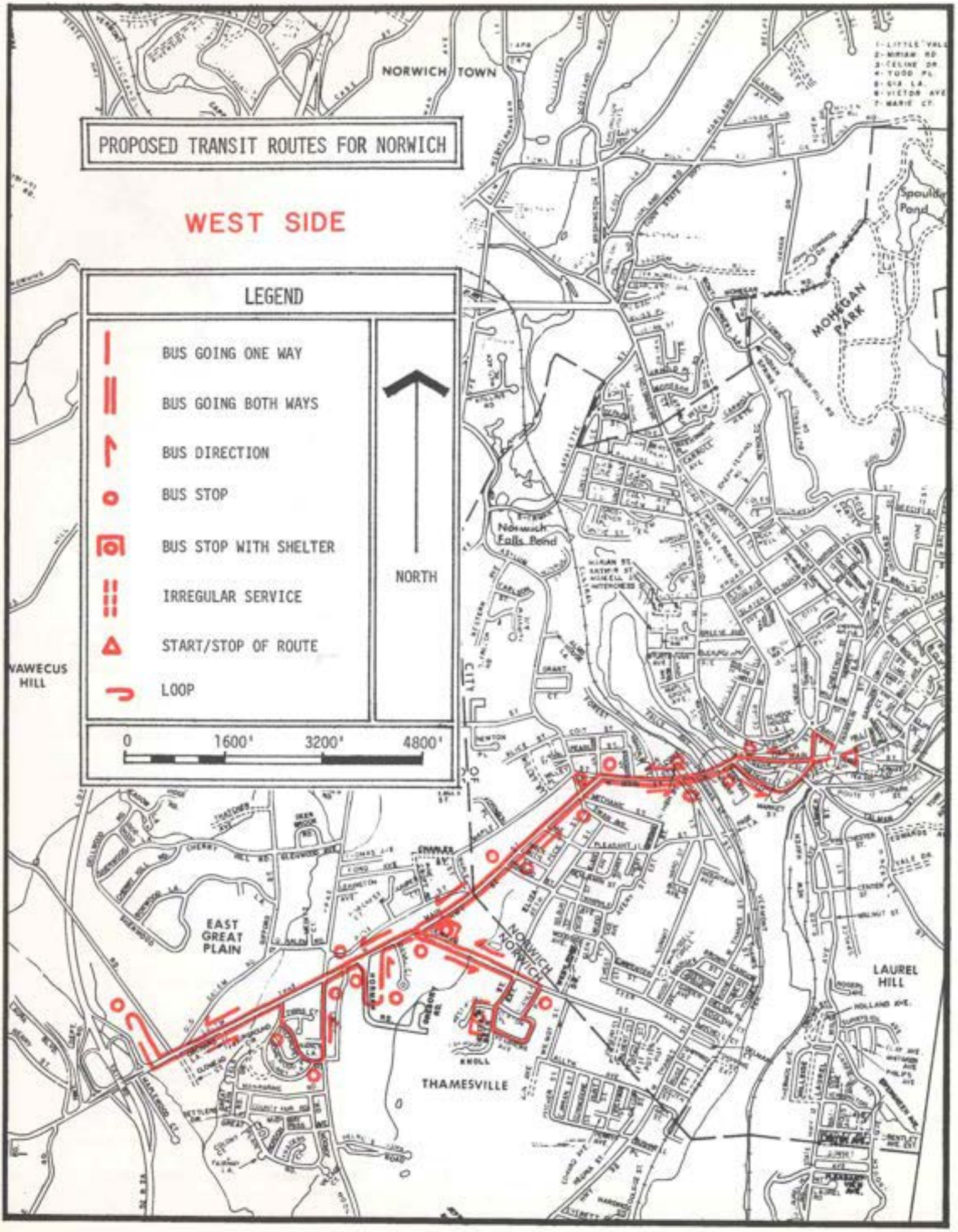
PROPOSED TRANSIT ROUTES FOR NORWICH
WEST SIDE
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1600'
3200'
4800'
NORWICH TOWN
Spaulding Pond
MOHEGAN PARK
Norwich Falls Pond
WAWECUS HILL
EAST GREAT PLAIN
NORWICH
LAUREL HILL
THAMESVILLE
KNOLL

FIGURE 7

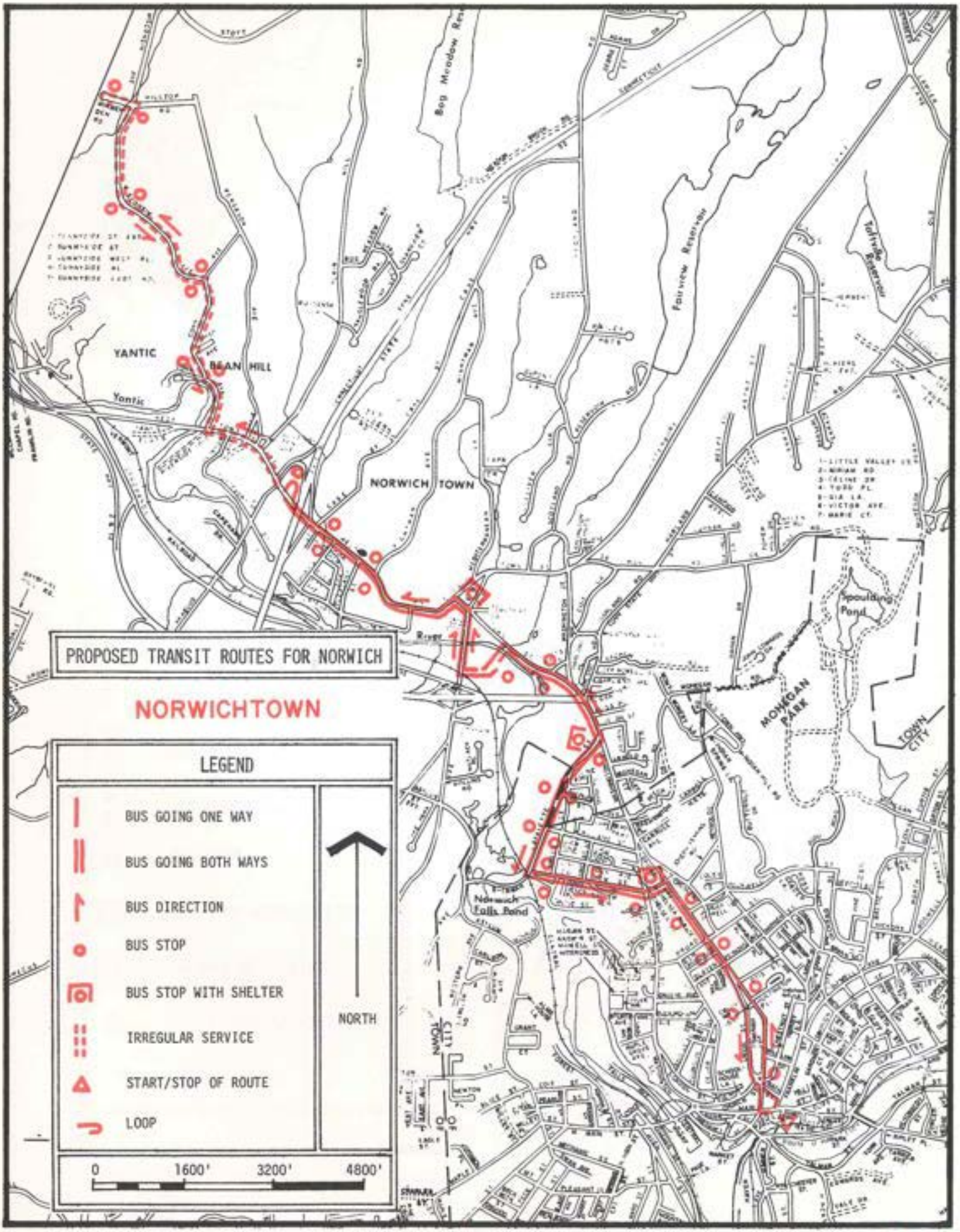
PROPOSED TRANSIT ROUTES FOR NORWICH
NORWICHTOWN
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1600'
3200'
4800'
YANTIC
BEAN HILL
NORWICH TOWN
Yantic
Bog Meadow Rd
Fairview Reservoir
Spaulding Pond
MOHEGAN PARK
TOWN CITY
Norwich Falls Pond

FIGURE 8

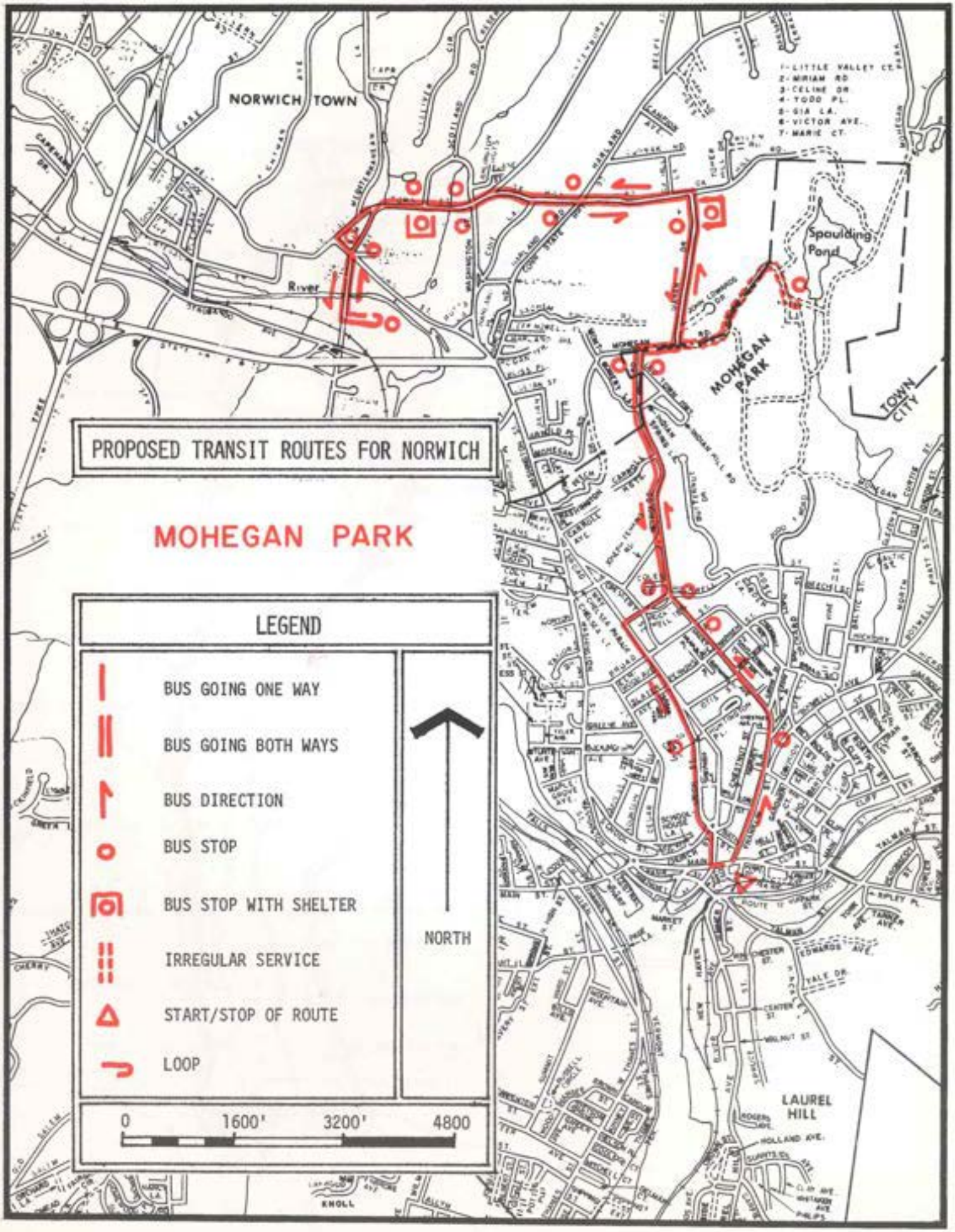
PROPOSED TRANSIT ROUTES FOR NORWICH
MOHEGAN PARK
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1600'
3200'
4800
NORWICH TOWN
Spaulding Pond
MOHEGAN PARK
TOWN CITY
LAUREL HILL
River

FIGURE 9

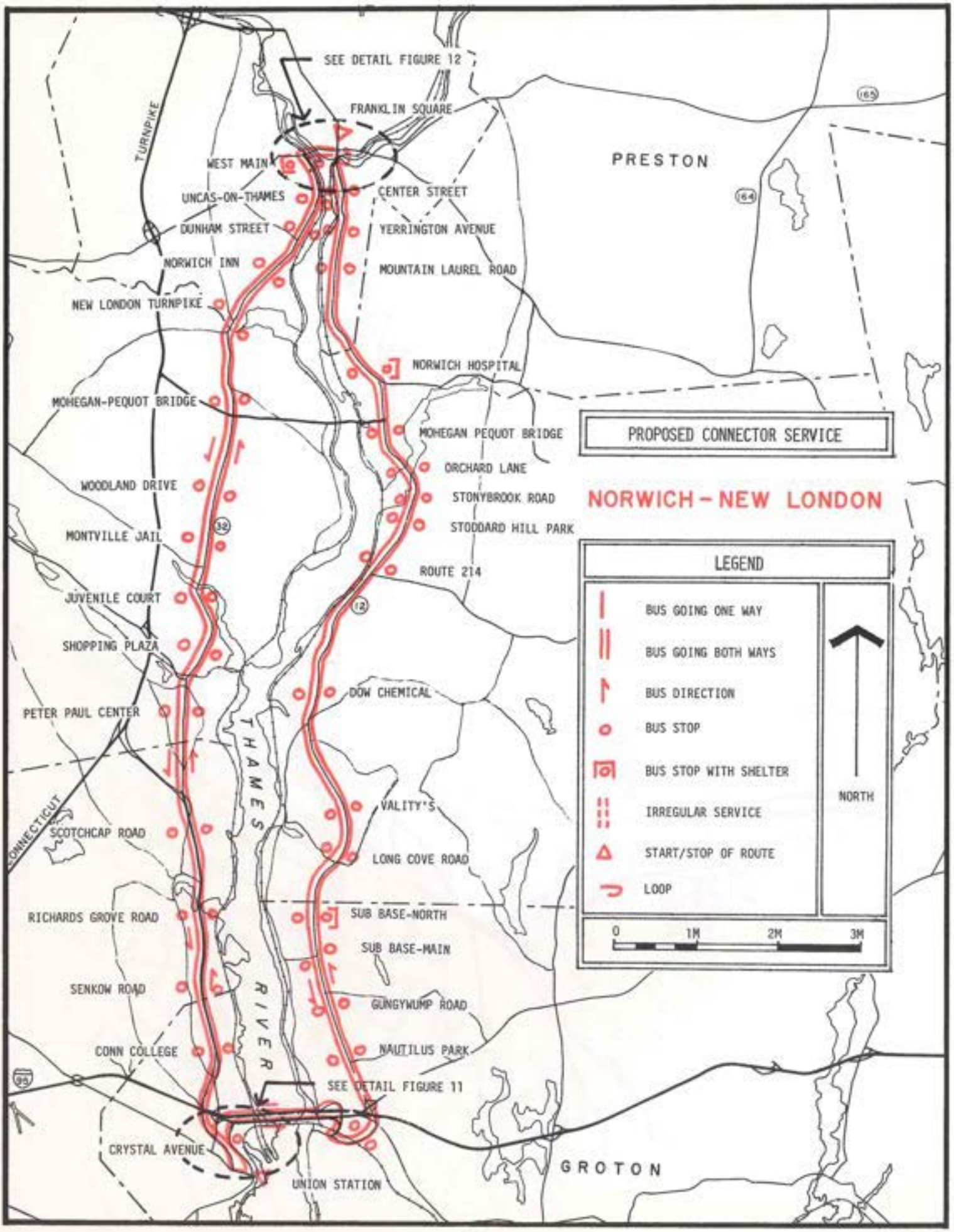
SEE DETAIL FIGURE 12
FRANKLIN SQUARE
TURNPIKE
WEST MAIN
UNCAS-ON-THAMES
CENTER STREET
DUNHAM STREET
YERRINGTON AVENUE
NORWICH INN
MOUNTAIN LAUREL ROAD
NEW LONDON TURNPIKE
NORWICH HOSPITAL
MOHEGAN-PEQUOT BRIDGE
MOHEGAN PEQUOT BRIDGE
ORCHARD LANE
WOODLAND DRIVE
STONYBROOK ROAD
MONTVILLE JAIL
STODDARD HILL PARK
ROUTE 214
JUVENILE COURT
SHOPPING PLAZA
DOW CHEMICAL
PETER PAUL CENTER
THAMES RIVER
VALITY'S
CONNECTICUT
SCOTCHCAP ROAD
LONG COVE ROAD
RICHARDS GROVE ROAD
SUB BASE-NORTH
SUB BASE-MAIN
SENKOW ROAD
GUNGYWUMP ROAD
CONN COLLEGE
NAUTILUS PARK
SEE DETAIL FIGURE 11
CRYSTAL AVENUE
UNION STATION
PRESTON
GROTON
PROPOSED CONNECTOR SERVICE
NORWICH - NEW LONDON
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1M
2M
3M

FIGURE 10

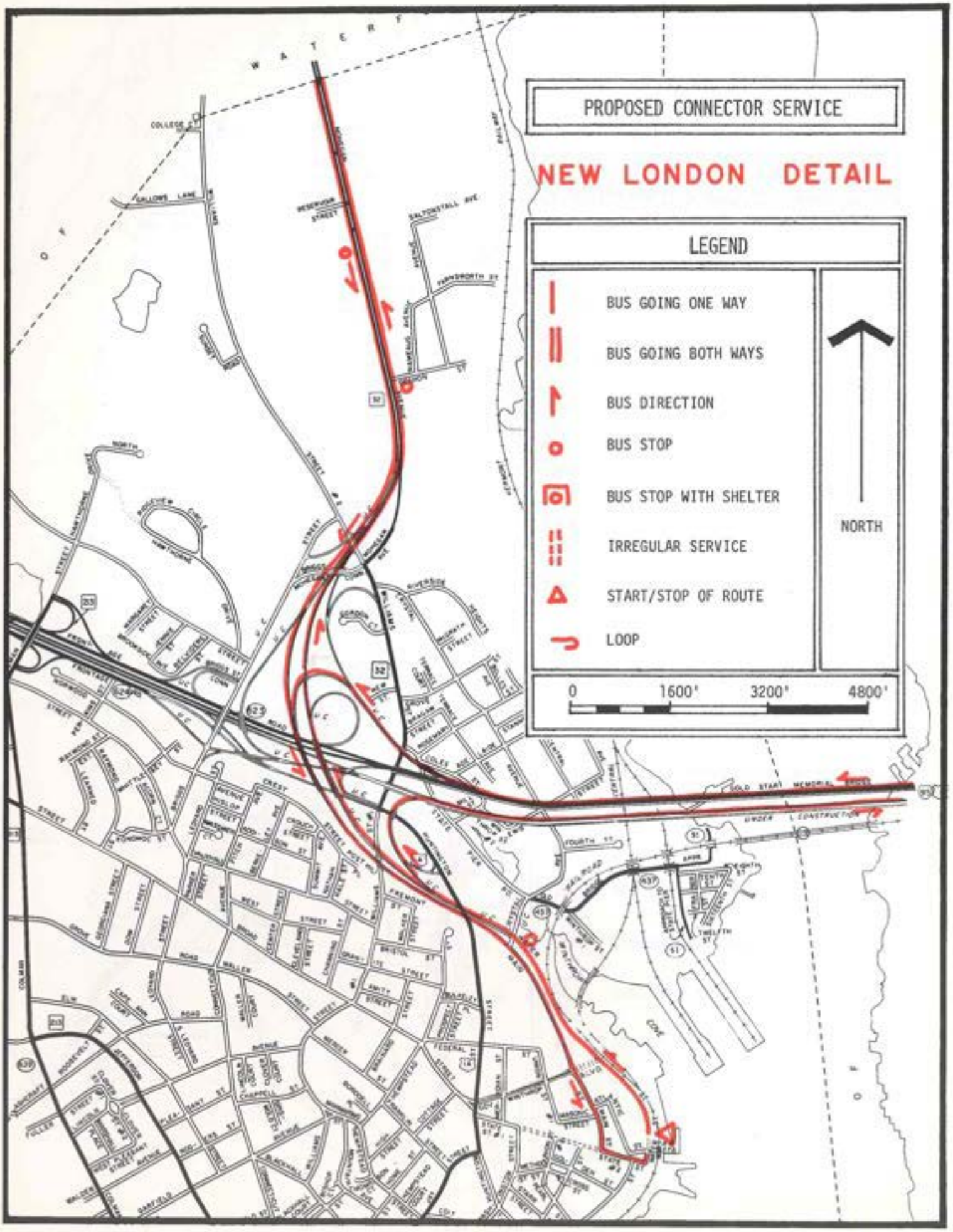
PROPOSED CONNECTOR SERVICE
NEW LONDON DETAIL
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1600'
3200'
4800'

FIGURE 11

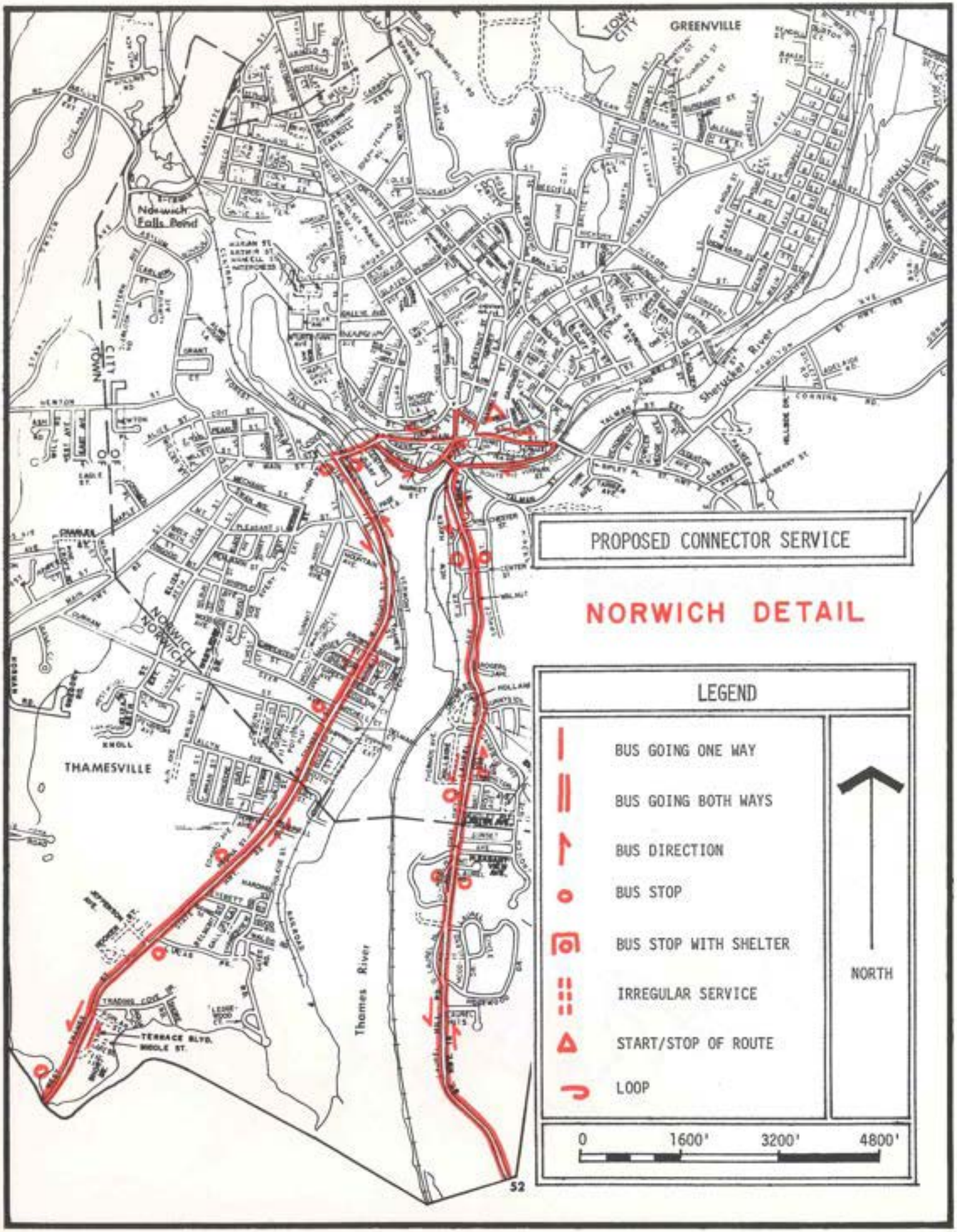
PROPOSED CONNECTOR SERVICE
NORWICH DETAIL
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1600'
3200'
4800'
GREENVILLE
THAMESVILLE
Thames River
Shetucket River
Norwich Falls Point
TERRACE BLVD.
MIDDLE ST.
52

FIGURE 12

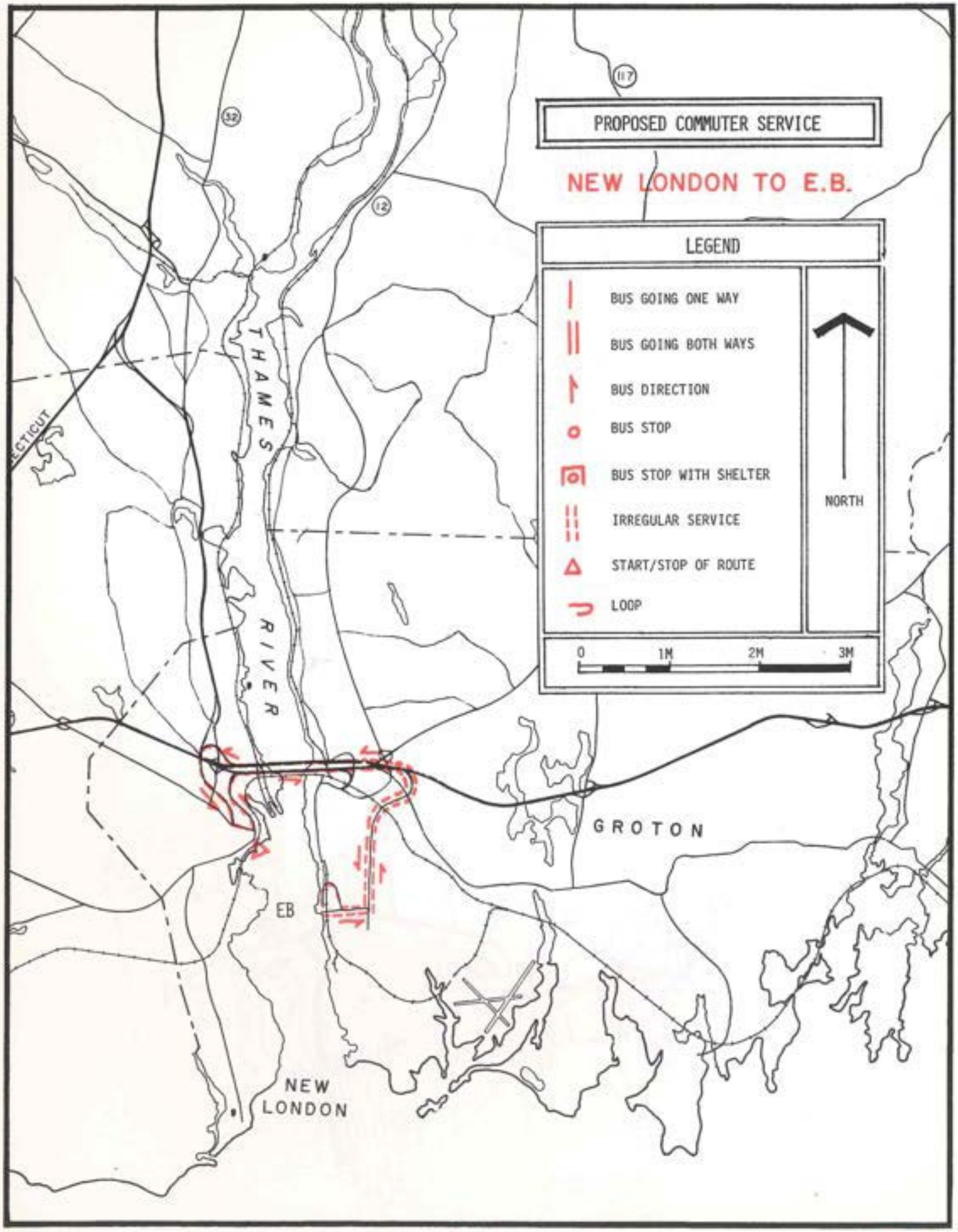
PROPOSED COMMUTER SERVICE
NEW LONDON TO E.B.
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1M
2M
3M
THAMES RIVER
GROTON
EB
NEW LONDON
117
32
12

FIGURE 13

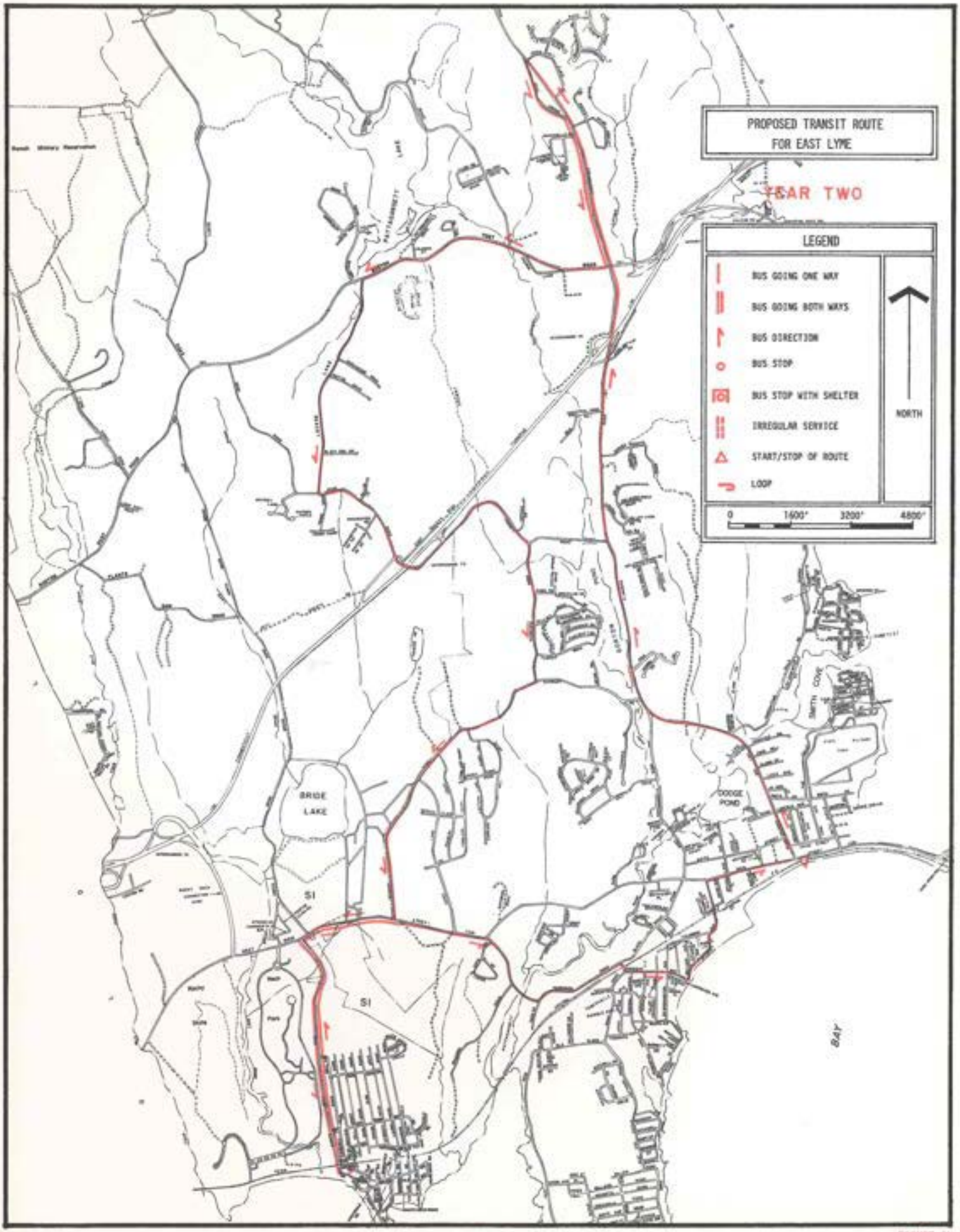
PROPOSED TRANSIT ROUTE
FOR EAST LYME
YEAR TWO
LEGEND
BUS GOING ONE WAY
BUS GOING BOTH WAYS
BUS DIRECTION
BUS STOP
BUS STOP WITH SHELTER
IRREGULAR SERVICE
START/STOP OF ROUTE
LOOP
NORTH
0
1600'
3200'
4800'
BRIDE LAKE
DODGE POND
SI
SI
BAY

FIGURE 14

APPENDICES

APPENDIX ONE

A STAFF PAPER ON TRANSFERS AND A FARE STRUCTURE

This report was prepared under grant number CT-09-0008 with the Urban Mass Transportation Administration of the U.S. Department of Transportation. This project was funded in part with a Technical Studies Grant from the Urban Mass Transportation Administration under the Urban Mass Transportation Act of 1964, with a grant from the Connecticut Department of Transportation, and with contributions from the member communities of the Southeastern Connecticut Regional Planning Agency.

PREPARED FOR THE SOUTHEASTERN CONNECTICUT TRANSIT DISTRICT
BY THE STAFF OF THE
SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
139 Boswell Avenue, Norwich, Connecticut

April, 1977

INTRODUCTION

The following paper was prepared by the staff of the Southeastern Connecticut Regional Planning Agency as part of the annual work program updating the Transportation Development Program. In the process of reexamining prior TDP recommendations regarding transfers, it became apparent that there were broader issues related to transfers and the system of fare structures which required clarification. Further, it was felt that the range of these issues was sufficiently broad to warrant a "white paper" to enable the staff and the Transit District members time to explore them prior to their inclusion in the Transportation Development Program.

BACKGROUND

Under the major heading of fare structure, the original TDP made a general recommendation (page 101) that transfers should be free. A more elaborate explanation on pages 128-129 held that transfers should not only be free but unlimited and available on all the various kinds of routes (local, connector, and commuter) to be provided in the system. The scenario was one in which a rider could, for example, board a bus in Norwichtown, transfer at Norwich's Franklin Square, and travel to Union Station in New London, having paid only one fare.

This approach was justified in the TDP on the need to stimulate ridership. Related to this objective were: 1) the "pay once" simplicity of the fare structure, 2) ease of travel, and 3) reduction of energy use due to non-use of auto for longer distance travel. The TDP recommendation also raised the counter issue of the inequality of charging the same fare for all riders, even though the individuals who take advantage of the free transfer might travel two or three times more distance for the same fare. Lastly, the recommendation also posed that free and "unlimited" transfers kept the system administratively simple.

While we sympathize with the desire to achieve simplicity, we find that the administrative structure for the financing of transit is extremely complex by its very nature, involving no fewer than 9 local governments, the State of Connecticut,

and the Federal Government, all responsible for funding transit operations in varying proportions. In retrospect, the so-called simplified transfer policy earlier recommended involves not only transfers but the entire system of fare structures as well. We believe, therefore, that the free transfers as proposed will likely prove to be administratively unworkable when put into actual operation unless certain shared funding conditions are met. Since these conditions have not previously been considered, we have to assume that the system as proposed will engender some significant difficulties. Perhaps, then, it is useful and necessary to review some of the many basic elements, objectives, and problems posed by free transfers in a complex fare structure system before outlining the options available for achieving equity.

The 1975 TDP skillfully argued that transferring is a burden and a disruption for a passenger and is an act which is always avoided in private auto use. Basically, the need to transfer constitutes a major inadequacy of public transportation from an individual user's point of view. This puts public transportation at a disadvantage when competing for riders in the marketplace where those riders have other options for travel.

Two opposing views emerge from this aspect of public transportation. The first view, essentially that taken by the original TDP, holds that the need to transfer is a handicap which should be overcome through a major marketing commitment, thus creating a positive image. For the price in time and inconvenience, the system would compensate the transfer rider by making the subsequent rides free of cost.

The other position holds that transferring is an inherent liability of public transportation just as the capital and operating costs of car ownership are inherent liabilities to private auto use. Thus, they "come with the territory" and cannot be made to appear as something they are not. This view holds that people who ride public transportation have chosen to do so because the advantages outweigh the disadvantages.

While both views would likely agree that the main objective of public transportation is capturing (more) paying riders, the issue of transfers revolves around the fear that not dealing with transfers in some special, incentive-like

way will discourage potential ridership. This view is complex, as it begins to raise questions about the profile of the people not using public transit which may or may not be valid as the alternatives to public transportation diminish. One factor to consider is that federal and state participation in this transit program is based on a new reality: lack of energy to continue to support an auto-oriented society. The scope of this cannot easily be brushed aside. The energy situation is growing more intense every day and is not something futuristic which may or may not occur. It is a fact that energy costs will climb as a basic function of supply. The simple fact is that more and more people will seek alternative means of transportation to save money in spite of the inconveniences.

When the first buses arrive in late 1978 we believe there will be a pool of people in need of public transportation who previously would not have considered themselves candidates for it. With new conditions for a rebirth of public transit, and a concommitant new ridership profile, the need to attract riders through transfer incentive programs may become somewhat less significant.

While the above thoughts are both theoretical and speculative, there are two very real issues which cannot be minimized, as was done in the original TDP. The first is common to all transit, while the second is more or less unique to the Southeastern Connecticut system. The common element is that the cost of the provision of transit is a direct function of distance and time. Therefore, to the extent that some costs are not borne by the ridership, they become a source of deficit. Free transfers, by their very nature, become an economic burden for the providers of the service. Support for the position of charging for transfers becomes even more apparent in multi-modal situations where the act of paying at the transfer point for the next ride is more or less taken for granted. It is not logical to think, for example, that one could go from Norwichtown, to downtown Norwich, then transfer to a bus going to New London for one fare, and then transfer again to a train for the same single fare! Clearly, the continuing costs involved in providing that service are too great to absorb, even under the most adverse incentive conditions.

The second point is more or less unique to Southeastern Connecticut, and it is here that the question of transfers spills over into the realm of fare structures for this system. It concerns the financial partnership on which the provision of the

service is based. As mentioned earlier, this partnership involves no fewer than 11 separate public entities, each supporting the system in varying proportions. Of the 11 entities, the financial participation of 10 of them is directly linked to ridership generated within precise town boundaries. Unless the funding arrangement for transit is significantly altered, this aspect has to be seen as the most critical, with implications that directly affect the question of transfers.

From this perspective, the issue of transfers revolves around the mechanics of issuing them and recording the revenues received on a town-by-town basis. A system of "free" transfers would not enable any of the towns along a route to capture revenue credit from a ride passing through, even though the cost of that particular part of the service would be paid by that town. This inequity seems paramount and demands a fare structure and transfer policy realistically related to the financial arrangement for sharing the costs of the provision of service, complex though it might be. As an example, passengers transferring from a local Norwich route to a bus going to New London would pass through Montville. While Montville would incur a share of the cost of operating buses through the town under the present TDP scheme, it would not be credited with a portion of the revenue generated by a transfer passenger from Norwich to New London. To summarize briefly:

1. Transferring is an inherent liability of public transportation. It must be balanced against many of the assets of public transportation, such as low unit cost.

2. The need to compete for riders in the marketplace as in the past will likely diminish over time as private automobile operation becomes more expensive for the average individual. Thus, while the growth of the use of the private auto was a major contributing cause of the demise of public transit, a reduction in private auto use will likely make it less necessary for public transit to compete for riders as it once had to do.

3. The costs of providing public transit are too great to ignore opportunities to capture revenue. In addition, the shared-cost nature of the transit system for Southeastern Connecticut requires a complex arrangement of fare-crediting on a town-by-town basis to offset costs which are being borne on the same basis. Economic fairness alone requires a fare structure and a transfer policy that enables a reasonably accurate accounting of revenues

and deficits by town.

Other considerations include the following:

The various kinds of routes to be provided under this system and the different combinations of transfers which are possible from one kind of route to another play an important role. There are three distinct types of routes: 1)local, 2)connector, and 3)commuter.

1. Local routes operate within the boundaries of a single town on a fixed schedule throughout the course of a day, picking up and discharging passengers at frequent intervals, usually every 2,000 feet in an urban situation.

2. Connector routes are those which operate across the boundaries of one or more municipalities. They also operate on fixed schedules throughout the day, but they pick up and discharge passengers at greater intervals.

3. Commuter routes will operate on a fixed basis and will likely cross the boundary of one or more municipalities. What distinguishes them from the other levels of service are that they will operate only during certain periods of the day.

In reviewing the various kinds of routes, then, we find both opportunities and extreme difficulties in providing free transfers from one kind of a route to another under the presently recommended fare structure which should require an accurate accounting of fares collected on a town-by-town basis.

Another factor to consider is the basic cost of operating a route. It is not always clear that the base route cost bears any direct relationship to ridership or revenue. Consequently, cost and revenue really have to be considered independently. To demonstrate this we can use a hypothetical example of the proposed connector route between Norwich and New London on Route 32. This route is approximately 13 miles long. If it costs $11.50 per hour to operate, and the route operates 14 hrs/day, 5 1/2 days per week, 4 1/2 weeks/month, the route will cost approximately $4,000/month to operate. Assuming a hypothetical, no-ridership situation, how would the cost of operating that route be distributed equitably? Equally amongst the four towns? On the basis of distance? Population? Revenue? Or on some other basis?

The following examples explore various methods and formulas for distributing the costs in an equitable manner. We have chosen to use mathematical examples as a technique for approximating equity to demonstrate what the actual cost distribution amongst the participating towns might be. We have found that the proportionate distribution can be more revealing about a method than the actual, "bottom-line" dollar amount.

Example #1

One of the most logical ways of equitably distributing the cost of operating the above hypothetical route would appear to be to distribute it on the basis of the mileage of operation in each town. This is, in fact, what the original TDP recommended.

This technique assumes that operating costs are a fixed function of distance. In this example, as in all the others that follow, an assumption will be made that total revenues collected for that month will be $2,500 leaving an operating deficit of $1,500. Using mileage only as the basis for distributing the deficit, the costs would be as follows:

	Route Miles/Town	% Of Total	Share of Deficit
Norwich	3.0	23	$ 345
Montville	4.8	37	555
Waterford	2.9	22	330
New London	2.3	18	270
Total For Route:	13.0	100	$1,500

Discussion: While this approach had the initial appeal of avoiding any concern for revenues, the analysis demonstrates that there are some significant inherent inequities heretofore unforseen. Clearly, Montville is being penalized for being a geographically large space lying between Norwich and New London. As such, this approach does not take into account the demand-for-the-service aspect which is more a function of population than it is of distance.

Example #2

The following example utilizes population as the basis for distributing the cost of operating a connector route. It, too, does not take into account revenues collected from each town thus avoiding the complex farebox collection process. The costs would be distributed as follows:

	Approximate 1977 Population	% Of Total Population	Share of Deficit
Norwich	44,500	41	$ 615
Montville	16,000	15	225
Waterford	18,000	17	255
New London	30,000	27	405
Total For Route:	108,500	100	$1,500

At first glance, this approach has certain inherent appeal. It is simple. It does not inordinantly penalize any town and it has all the appearances of being equitable within the limits of our inability to develop an accurate fare-recording system. But further consideration suggests that towns should be credited with the revenues generated within their boundaries. While the above procedure does not inordinately penalize, neither does it reward for ridership generated. In order to do this, revenues collected on a town-by-town basis must be used in the calculations.

Example #3

	Approximate 1977 Population	% Of Total	Base Share Of Cost	Hypothetical Revenue/Town	Outstanding Deficit/Town
Norwich	44,500	41	$1,640	$1,100	$ 540
Montville	16,000	15	600	250	350
Waterford	18,000	17	680	175	505
New London	30,000	27	1,080	975	105
Total:	108,500	100	$4,000	$2,500	$1,500

Discussion: Clearly, this formula is a step forward in terms of equity. Two problems are apparent: 1)it is not "simple", 2)it requires either an accurate accounting of revenue or a sampling technique in which there is widespread confidence and mutual agreement among the towns participating in the Transit District.

CONCLUSIONS

The proposed structure for financing a regional transit system has certain serious flaws which have been revealed in the analysis of past TDP recommendations for fare structure and free transfers. The flaws involve assumptions about the "regional" character of the transit system as it relates to revenues and deficits. If the goal of this program is the demonstration of intergovernmental cooperation, then the complex funding system presently under consideration will serve to meet that goal. If, on the other hand, the goal is the provision of transit services, then another structure may be needed.

What has become apparent is that the proposed system is "regional" in name only, yet recommendations have previously been made on the basis that the system is really, rather than nominally, regional. The recommendation for free transfers is amongst these. In our opinion, the present financial structure renders any such proposals unworkable.

Clearly, the issue of fare structure and transfers is complex, and involves a number of different subfactors, some of which are highly speculative at this time. Our analysis suggests two basis conclusions:

A. If the complex financial structure established to support transit in Southeastern Connecticut remains, then serving that structure supercedes all other considerations. As a consequence, any transfer and fare structure plan must first be equitable on a town-by-town basis.

B. The financial structure for transit is so complicated as to be almost administratively unworkable. Furthermore, trying to serve it equitably may be an impossible task. Therefore, efforts henceforth should be directed toward changing it. This latter conclusion is a radical departure from conventional wisdom and one for which we were, quite frankly, unprepared prior to this analysis. Nevertheless, it is a conclusion which has considerable appeal.

We have also concluded that:

1. The fare structure and transfer policy proposed in the original TDP for connector and commuter routes was basically inequitable. Unlike the fare structure for local routes, there is no way to identify specific sources of revenue on a town-by-town basis. Furthermore, the cost of a connector route was to be determined as a function of distance which we have shown is one of the least equitable ways of distributing the deficit in this particular regional situation.

2. The key to the fare structure/transfers problems seems to lie in the distinction between the different types of routes. Under the present financial structure where each town pays a proportionate cost of a connector and a commuter run, free transfers, i.e., no fares collected on those routes, becomes administratively unworkable unless all the towns involved agree that they will absorb the loss in some "proportionate " fashion. This they have not yet done.

3. The marketing aspects of free transfers have to be kept separate and distinct from the basic principles of the fare structure for the operation of the transit program which itself is based on a complex financial arrangement among 11 separate entities. If there is marketing merit in free transfers, it should be limited to those initial activities of the marketing program which themselves are geared to stimulate new ridership at the outset of the expanded transit. Thus, added to the list of promotional activities such as "nickel-fare days," might very well be "free-transfer days." Beyond this, any consideration of free transfers on a permanent basis must be limited to transfers from one local route to another to avoid intermunicipal inequity in fare collection. If it was determined later in the transit program that free transfers were needed to stimulate ridership, then at that time such an option would be available should all the towns in the transit district so decide. We believe this approach is far more sensible at the outset than determining later that significant amounts of revenue are being lost, or that deficits are being borne inequitably through the policy of free transfers throughout the system.

4. The foregoing examples suggest that the data used to calculate the cost

of operating a route provide no clue as to how the deficit is to be shared in a nominally regional system such as in Southeastern Connecticut. If the multi-municipal structure is to remain, then complex formulas based on population and revenues are going to have to be developed to rationalize the distribution of the deficit between the intervening towns along all connector and commuter routes. Furthermore, the stability of the multi-municipal Transit District structure will depend on the unanimous agreement of all towns that the deficit distribution formulas are fair and equitable. This agreement might very well include a provision for a regular census of ridership to determine in what proportion the fares should be credited. Of necessity, this census will have to include a distinction for elderly and handicapped riders and any others who might be paying less than full fares.

5. If a regular ridership census is not agreeable, it will require the installation of a farebox with separate "pockets." The driver, upon crossing a municipal boundary, will switch pockets so that all fares collected in that particular municipality will be held separate until the end of the day when they can be properly recorded. Consideration should be given at the earliest possible time to exploring fare box options with this capability.

APPENDIX TWO

URBAN MASS TRANSPORTATION ADMINISTRATION
NORWICH/NEW LONDON
CAPITAL GRANT APPLICATION

Project Description

CATEGORY	NUMBER	ITEM	UNIT COST	TOTAL
Buses	3	40' 48-passenger buses	$ 90,000	$ 270,000
	11	31' 33-passenger buses	75,000	825,000
	14	Registering fare boxes	2,143	30,000
	16	Two-way radios	1,400	22,400
	1	Base radio transceiver and antenna network	10,000	10,000
		Spare parts: 2 engines, $6,000 each; 2 transmissions, $5,000 each; 2 compressors, $1,300 each.		24,600
		Bus Subtotal		$1,182,000
Facilities	1	New Maintenance Administrative and Storage Facility - 30,000 sq. ft.		1,250,000
		Land - 8.89 acres		89,000
		Final Engineering		200,000
		Demolition		50,000
		Hoist Equipment		50,000
		Tools, work benches, welding, tire mounting		50,000
	1	Steam Cleaner	700	700
	1	Vacuum Cleaner	600	600
	1	Bus Washer	45,000	45,000
	1	Coin Counter	2,700	2,700
	2	Safes	1,000	2,000
		Office Equipment		8,000
	1	3/4 ton service truck	7,000	7,000
	2	Fuel Storage tanks and installation	15,000	30,000
	2	Fuel Pumps	5,000	10,000
		Facilities Subtotal		1,795,000
Transit Related Equipment	40	Benches	300	12,000
	300	Signs and Posts	100	30,000
	15	Shelters	3,000	45,000
		Transit Related Equipment Subtotal		87,000
		TOTAL: All Categories		3,064,000
		Add 10% Contingencies		306,400
		GRAND TOTAL		$3,370,400

APPENDIX THREE

DESCRIPTION OF TRANSIT ROUTES

LOCAL SERVICE - CITY OF NORWICH

ROUTE NAME: LAUREL HILL - HAMILTON AVENUE

Start at: Franklin Square
Go out Main Street (N)
Stop at: Main Street at Viaduct opposite Park Street
Turn right onto Viaduct
Turn left onto Laurel Hill Avenue (Route 12)
Stop at: Laurel Hill Park, Laurel Hill Avenue between Winchester and Center Street
Stop at: Laurel Hill Avenue opposite Garfield Avenue
Stop at: Laurel Hill Avenue at Laurel Hill Avenue #2 at Volunteer Fire Co.
Turn right into Administration Drive at Norwich Hospital
Stop and Loop at Administration Building
Turn left and head North up Route 12
Stop at: Laurel Hill Road at Mountain Laurel Road, near side
Stop at: Laurel Hill Road at Yerrington Avenue, (Cumberland Farms), far side
Stop at: Laurel Hill Road at Center Street, near side
Turn right onto Viaduct
Turn right onto East Main Street
Stop at: East Main Street at Ripley Place, far side
Turn left onto Hamilton Avenue
Stop at: Hamilton Avenue at Main Street opposite Hedge Avenue
Stop at: Hamilton Avenue at Palmer Street #1, far side
Stop at: Hamilton Avenue at Gillette Road, far side
Stop at: Hamilton Avenue at Rosewood Place - Shelter
Stop and Loop at Hamilton Avenue opposite Smith Avenue
Turn left onto Hamilton Avenue heading S.W.
Stop at: Hamilton Avenue opposite Gillette Road
Stop at: Hamilton Avenue at Hedge Avenue, near side
Turn right onto East Main Street
Stop at: East Main Street at Talman Street Ext., near side
Stop at: Main Street at Park Street, near side
Stop at: Woolworths Main Street and Franklin Street

LOCAL SERVICE - CITY OF NORWICH

ROUTE NAME: NORWICHTOWN

Start at: Franklin Street at Main, by Woolworths
Turn left onto Bath
Turn right onto Broadway
Stop at: Broadway at Chestnut, by City Hall, far side
Stop at: Broadway at Huntington Place, far side
Stop at: Broadway at Broad, near side
Stop at: Broadway at Rockwell Street, far side
Turn left onto Chelsea Parade
Stop at: Chelsea Parade at Washington, near side - Shelter
Stop at: Sachem Street at Uncas, near side
Stop at: Sachem at Lafayette, near side
Turn right on Lafayette
Stop at: Lafayette at Williams, near side
Stop at: Lafayette at Clinic Drive, near side
Stop at: Lafayette at Washington, near side
Turn left onto Washington
Stop at: Washington at Butts Lane, far side
Turn left into Mall
Stop at Mall entrance, by Caldors
Go out rear entrance of Mall, turn right onto N.L. Tpke.
Turn left onto Town Street
Stop at: Town Street at Elm Avenue, far side, opposite John Mason School - Shelter
Turn left onto West Town Street
Stop at: Town Street at Wightman Avenue, far side
Stop at: West Town Street at Case Street, near side
Turn right into Commuter Parking Lot, Loop and stop.*
Turn left onto West Town Street
Stop at: West Town Street at Sholes Avenue, near side
Stop at: West Town Street opposite Wightman Avenue
Turn right onto Town Street
Turn right onto N.L. Tpke.
Turn left into Norwichtown Mall

* During peak hours, route continues to Norwichtown Industrial Park as shown on map.

ROUTE NAME: NORWICHTOWN, cont.

Stop at: Main Mall entry
Exit Mall to East Town Street, turn right onto East Town Street
Stop at: East Town Street opposite Butts Lane
Turn right onto Lafayette Street
Stop at: Lafayette at Washington Street - Shelter
Stop at: Lafayette opposite Clinic Drive
Stop at: Lafayette opposite Williams
Turn left onto Sachem
Stop at: Sachem opposite Oneco
Stop at: Sachem at Washingotn, near side
Continue on Chelsea Parade
Turn right onto Broadway
Stop at: Broadway opposite Rockwell
Stop at: Broadway at Broad, far side
Turn right onto Union
Stop at: Union opposite Crossway Street
Turn right onto Broadway
Turn left onto Main Street
Turn left onto Franklin Street
Stop at: Franklin at Main, by Woolworths

ROUTE NAME: WEST SIDE

Start at: Franklin Square, at Franklin and Main Streets by Woolworths
Turn left onto Bath Street
Turn left onto Broadway
Turn right onto Main Street
Stop at: Main at Church Street (Dunkin Donuts), near side
Stop at: West Main at Thames Street, far side
Stop at: West Main at Ann Street, near side
Stop at: West Main at Asylum, near side
Stop at: West Main opposite Osgood Street, at Westgate Shopping Center
Turn left onto Dunham Street
Stop at: Dunham at West Main
Turn right onto Elizabeth Street Extension
Stop at: Elizabeth Street at Westwood - Shelter
Turn left onto Pembroke Avenue
Turn left onto Clifton Place
Turn right onto Stanley Place
Stop at: Stanley Place at Dunham Street
Turn left onto Dunham Street
Stop at: Dunham at West Main Street - Shelter
Turn left onto West Main Street
Stop at: West Main at N.L. Tpke, near side
Turn right into Barkers Shopping Area - Stop at: Barkers - Exit Barkers
Turn left onto Salem Tpke., heading East
Turn right onto Surrey Lane
Turn left onto Sycamore Road
Stop at: Sycamore at Surrey Lane, far side
Stop at: Sycamore at N.L. Tpke., near side
Turn left onto N.L. Tpke.
Stop at: N.L. Tpke. at West Main, near side
Turn right onto West Main
Stop at: West Main at Jones Court, far side
Turn right onto Norman Road
Turn left into Marcus Plaza
Stop at: Genovese Drug Store, Exit onto West Main

ROUTE NAME: WEST SIDE, cont.

Turn right onto West Main Street
Stop at: West Main at Dunham, near side
Stop at: West Main at Osgood Street, far side
Stop at: West Main at Mechanic Street, near side
Stop at: West Main at Thames Street, near side
Turn right onto Shetucket Street
Stop at: Shetucket at West Main
Turn right onto Main Street
Turn left onto Franklin Street
End route at Franklin at Main Street by Woolworths

ROUTE NAME: MOHEGAN PARK

Start at: Franklin Square, Franklin Street at Main, by Woolworth's
Stop at: McKinley Avenue past Boswell Avenue
Stop at: McKinley Avenue at Broad Street, near side
Stop at: McKinley Avenue at Rockwell, near side
Stop at: Reynolds Road at Mohegan Road, near side
Jog left onto Mahan Drive*
Stop at: Mahan Drive at Mohegan Community College - Shelter
Left onto Ox Hill Road
Stop at: Ox Hill Road at Harland Road, far side
Stop at: Town Street at Washington, far side
Stop at: Town Street at Huntington Lane, far side, opposite United Workers
Turn left onto Elm Avenue
Stop at: Elm Avenue at Town Street, near side, by Green
Go across Town Street, down N.L. Tpke.
Left into Norwichtown Mall
Loop adn Stop at: main entry of Mall
Exit onto N.L. Tpke., turning right
Turn left onto East Town Street
Stop at: East Town Street, Green opposite John Mason School - Shelter
Turn right onto Town Street
Stop at: Town Street at United Workers - Shelter
Stop at: Town Street at Washington, near side
Stop at: Ox Hill at Harland Road, near side
Turn right onto Mahan Drive
Stop at: Mahan Drive at Mohegan Community College
Jog left onto Reynolds Road
Stop at: Reynolds Road at Mohegan Road, far side, by ball field
Stop at: Reynolds Road at Rockwell, near side
Turn right onto Rockwell
Turn left onto Broadway
Turn right onto Union
Stop at: Union Street opposite Crossway Street
Turn right onto Broadway
Turn left onto Main Street
Turn left onto Franklin Street
Stop at: Woolworth's at Franklin at Main

* During summertime route varies as shown on map.

ROUTE NAME: TAFTVILLE

Start at: Franklin Square
Go out Main Street (N)
Stop at: Main at Route 12 (opposite Park Street)
Stop at: North Main opposite Roath Street
Stop at: North Main at Golden Street, near side
Turn left onto Central Avenue
Stop at: Central Avenue opposite Hickory Street
Stop at: Central Avenue at 4th Street, near side
Stop at: Central Avenue at 8th Street, near side
Stop at: Central Avenue, opposite 13th Street
Stop at: Boswell Avenue at North Main Street
Stop at: Boswell Avenue at McKay Street, near side
Stop at: Norwich Avenue at Blissville Road, near side
Stop at: Norwich Avenue at Newent Road (Route 169), far side
Turn left onto Providence Street
Stop at: Providence Street at N. 2nd Avenue, near side
Stop at: Providence Street opposite Hunters Avenue
Stop and Loop at Reservoir, return down Providence Street
Turn right onto Hunters Avenue
Turn left onto South B
Stop at: South B at South 4th, near side
Stop at: South B at South 2nd, near side
Turn right onto Norwich Avenue
Stop at: Norwich Avenue at Maennerchor Avenue, far side
Stop at: Norwich Avenue, opposite Blissville Road
Stop at: Boswell Avenue,opposite McKay Street (A&P) - Shelter
Stop at: Boswell Avenue at North Main
Stop at: Central Avenue at 13th Street, near side
Stop at: Central Avenue at 9th, near side
Stop at: Central Avenue at 6th, near side
Stop at: Central Avenue at 2nd, near side
Stop at: Central Avenue at Hickory, far side
Stop at: North Main Street at Roath Street, near side
Stop at: Main Street at Park Street, near side
Stop at: Franklin Square, by Woolworth's

ROUTE NAME: MALL VIA BROAD STREET

Start at: Union Station
Go out Water Street
Turn left onto Governor Winthrop Blvd.
Stop at: Huntington Street, near side
Turn onto Broad Street
Stop at: Broad at Hempstead, near side
Stop at: Broad at Williams, far side - Shelter
Stop at: Broad at Connecticut Avenue, near side
Stop at: Broad at Ledyard Street, near side
Stop at: Broad at Raymond Street, near side
Stop at: Broad at Coleman, near side
Turn right onto Coleman
Stop at: Coleman at Vauxhall, near side
Stop at: Coleman at Bayonet, near side
Turn left onto Bayonet
Turn left into New London Mall
Stop at: Outlet Company
Exit from Mall onto Bayonet Street, turning right
Stop at: Bayonet at Coleman
Turn right onto Coleman
Stop at: Vauxhall Street, near side
Stop at: Coleman, at Waldo Street, near side
Turn left onto Broad Street
Stop at: Broad at Coleman, far side
Stop at: Broad Street at Georgiana, near side
Stop at: Broad Street at Ledyard, near side
Stop at: Broad Street at Connecticut Avenue, far side
Stop at: Broad Street at Williams, far side
Stop at: Broad Street at Hempstead, far side - Shelter
Turn left onto Governor Winthrop Blvd.
Stop at: Winthrop Blvd. at Meridan Street, far side
Turn right onto O'Neill Drive
Turn left onto State Street
Turn left onto Water Street
Stop at: Union Station

LOCAL SERVICE: CITY OF NEW LONDON

ROUTE NAME: HIGH SCHOOL

Start at: Union Station
Go out Water Street
Turn left onto Governor Winthrop Blvd.
Stop at: Governor Winthrop at Meridan, near side
Turn left onto Huntington
Stop at: Huntington, opposite State Street
Turn right onto Jay Street
Stop at: Jay Street at Franklin, near side
Stop at: Jay Street at Hempstead, near side
Stop at: Truman Street at Blackhall, opposite Blinman
Turn right onto Blackhall Street
Stop at: Blackhall at Williams, near side
Stop at: Blackhall at Garfield, near side
Turn left onto Garfield
Turn right onto Elm Street
Stop at: Elm at Rigers, near side
Stop at: Elm at Lincoln, near side
Stop at: Elm at Ashcraft, near side
Turn left onto Ashcraft
Turn right onto Jefferson
Stop at: Jefferson at Coleman, far side
Turn left onto Chester
Stop at: Chester at Jefferson, far side
Turn right onto Michael
Stop at: Michael at Chester, far side
Stop at: Michael and Anthony
Stop at: Anthony at Chester
Turn left onto Chester
Turn right onto Jefferson
Stop at: Jefferson at Boulder Drive, far side
Stop at: Jefferson at Coleman, near side
Turn right onto Coleman
Stop at: Coleman at Ashcraft, far side

ROUTE NAME: HIGH SCHOOL, cont.

Stop at: Coleman at Walden - Shelter
Turn left onto Bank Street
Stop at: Bank opposite Coleman
Stop at: Bank at Ocean, near side
Stop at: Bank at Shaw, near side
Turn right onto Truman
Stop at: Truman at Blinman, near side
Stop at: Truman at Coit Street, near side
Turn left onto Huntington
Stop at: Huntington at State, near side
Turn right onto Winthrop Blvd.
Stop at: Winthrop at Meridan Street, far side
Turn right onto O'Neill Drive
Turn left onto State Street
Turn left onto Water Street
Stop at: Union Station

ROUTE NAME: N.L. MALL VIA CONNECTICUT COLLEGE

Start at: union Station at Water Street
Turn right onto Crystal Avenue
Stop at: Crystal Avenue at Water Street, far side
Stop at: Crystal Avenue at Fourth Street, near side
Stop at: Crystal Avenue at Adelaide Street, near side
Stop at: Crystal Avenue at Grove Street, near side
Stop at: Crystal Avenue at Riverside Heights, far side
Turn right onto Williams Street
Turn right onto Mohegan Avenue
Stop at: Mohegan Avenue at Deshon Street, near side
Turn left at Connecticut College, main gate
Stop at: Main intersection - Shelter
Stop at: Campus Road at Williams
Turn left onto Williams
Turn right onto Briggs Street
Turn right onto Bayonet Street
Turn right onto Hawthorne Drive
Stop at: Hawthorne Drive at Bayonet
Stop at: Hawthorne Drive at Ridgeview Circle (E)
Stop at: Hawthorne Drive at Ridgeview Circle (W)
Turn left onto Hawthorne Drive (N)
Stop at: Hawthorne Drive and Hawthorne Drive (N), far side
Stop at: Hawthorne Drive (N) at Bayonet
Turn right onto Bayonet
Turn left into New London Mall
Stop at: Outlet Company
Exit Mall onto Bayonet Street, turning right
Stop at: Bayonet at Coleman, near side
Turn left onto Hawthorne Drive (N)
Stop at: Hawthorne Drive (N) and Hawthorne Drive, near side
Turn right onto Hawthorne Drive
Stop at: Hawthorne Drive opposite Ridgeview Circle (W)
Stop at: Hawthorne Drive opposite Ridgeview Circle (E)
Stop at: Hawthorne Drive at Bayonet Street, near side

ROUTE NAME: N.L. MALL VIA CONNECTICUT COLLEGE, Cont.

Turn left onto Bayonet
Turn left onto Briggs Street
Turn right onto Williams Street
Turn left onto Crystal Avenue
Stop at: Crystal Avenue at Williams, far side
Stop at: Crystal Avenue at Grove Street, near side
Stop at: Crystal Avenue at Adelaide, near side
Stop at: Crystal Avenue opposite 4th Street
Stop at: Crystal Avenue at Water Street, near side
Turn left onto O'Neill Drive
Turn left onto State Street
Turn left onto Water Street
Stop at: Union Station

LOCAL SERVICE: CITY OF NEW LONDON

ROUTE NAME: OCEAN BEACH

Start at: Union Station
Go out Water Street
Turn left onto Winthrop Blvd.
Turn left onto O'Neill Drive
Turn left onto State Street
Turn right onto Bank Street
Stop at: Bank at Tilley, near side
Stop at: Bank at Howard, near side
Stop at: Bank at Truman, near side
Turn left onto Ocean Avenue
Stop at: Ocean at Bank Street, far side
Stop at: Ocean at Lee, near side
Stop at: Ocean at Willetts, near side
Stop at: Ocean at Fowler Court, near side
Stop at: Ocean at Dell Street, near side - Shelter
Stop at: Ocean, opposite School Street
Stop at: Ocean at Thames Street, near side
Stop at: Ocean at Farmington Avenue
Stop at: Ocean at Westridge, near side
Stop at: Ocean at Gardner, near side
Stop at: Ocean, opposite Beech Drive
Stop at: Ocean at Glenwood, near side
Stop at: Ocean Avenue at Greenway, near side
Stop at: Ocean at Bayshore, near side
Stop at: Ocean at Highland, near side
Stop at: Ocean at Neptune, near side
Turn left onto Neptune
Stop at: Neptune at Mott Avenue
Turn left onto Pequot Avenue
Stop at: Pequot Avenue opposite Lower Blvd.
Turn left onto Lower Blvd.
Stop at: Lower Blvd. opposite Worthington Road
Stop at: Lower Blvd. at Glenwood Avenue, near side
Stop at: Lower Blvd. at Parkway North, near side

ROUTE NAME: OCEAN BEACH, cont.

Stop at: Lower Blvd. at Montauk Avenue, near side
Turn left onto Montauk
Stop at: Montauk at Gardner, near side
Stop at: Montauk at Westomere Terrace, near side
Stop at: Montauk Avenue at Mitchell College - Shelter
Stop at: Montauk at Plant Street, near side
Stop at: Montauk Avenue, before Harris Street, opposite Sherman Street
Stop at: Montauk Avenue, before School Street, at Harbor School
Stop at: Montauk Avenue at L & M Hospital - Shelter existing
Stop at: Montauk opposite Perry
Stop at: Montauk at Willetts, near side
Stop at: Montauk at Denison, near side, at Montauk Motors
Stop at: Montauk at Tinker Court, near side
Stop at: Montauk at Bank Street, near side
Turn right onto Bank Street
Stop at: Shaw Street at Bank, near side - Shelter
Turn right onto Bank Street
Stop at: Bank Street at Howard, near side
Stop at: Bank Street, opposite Tilley Street
Turn right onto State Street
Turn left onto Water Street
Stop at: Union Station

CONNECTOR SERVICE-ROUTE 12, NORWICH TO NEW LONDON

Start at: Franklin Square, Norwich
Go North on Main Street
Stop at: Main Street opposite Park Street
Turn right onto via duct
Turn left onto Route 12
Stop at: Route 12 between Winchester and Center Street
Stop at: Route 12 opposite Garfield Avenue
Stop at: Route 12 at Laurel Hill Avenue #2, at Volunteer Fire Co.
Stop at: Route 12 Norwich Hospital, Cemetary
Stop at: Route 12 at Mohegan Pequot Bridge, far side
Stop at: Route 12 opposite Orchard Lane
Stop at: Route 12 opposite Stonybrook Road
Stop at: Route 12 at Stoddard Hill Park
Stop at: Route 12 opposite Route 214
Stop at: Route 12 at Dow Chemical Co. gate
Stop at: Route 12 opposite Vality Shopping Center
Stop at: Route 12 at Long Cove Road, near side
Stop at: Route 12 at Sub Base entrance, north
Stop at: Route 12 at Main Sub Base entrance, far side
Stop at: Route 12 opposite Gungywump Road
Stop at: Route 12 opposite Nautilus Park
Turn right onto Kings Highway
Stop at: Caldors Shopping Center
Turn right onto Bridge Street Extension
Cross Gold Star Bridge
Exit left to Downtown New London
Go down Eugene O'Neil Drive
Turn left onto State Street
Turn left onto Water Street
Stop at: Union Station

CONNECTOR SERVICE-ROUTE 32, NORWICH TO NEW LONDON

Start at: Franklin Square, Norwich
Go West on Main Street
Turn left onto Route 32
Stop at: Route 32 at intersection of Route 82-Shelter
Stop at: Route 32 at Uncas-on-Thames
Stop at: Dunham Street, near side
Stop at: Route 32 at Norwich Inn
Stop at: Route 32 at New London Turnpike, Leffingwell Road
Stop at: Route 32 at the Mohegan Pequot Bridge
Stop at: Route 32 at Woodland Drive, near side
Stop at: Route 32 at Montville Jail
Stop at: Route 32 at Juvenile Court
Stop at: Route 32 opposite Beit Bros. Shopping Plaza
Stop at: Route 32 at the Peter-Paul Center
Stop at: Route 32 at Scotchcap Road, near side
Stop at: Route 32 Richards Grove Road, near side
Stop at: Route 32 Senkow Road, near side
Stop at: Route 32 at Conn. College entrance, near side
Go onto O'Neill Drive
Turn left onto State Street
Turn left onto Water Street
Stop at: Union Station